

A REVISION OF THE FAMILY CERACIDAE (LEPIDOPTERA, TORTRICOIDEA)

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SYNOPSIS

The author proposes to re-establish Meyrick's family Ceracidae as an independent member of the superfamily Tortricoidea. From a study of a considerable amount of material the group is revised and a new genus, eight new species, and ten new subspecies are described.

SEVERAL authors who dealt with the conspicuously coloured large moths of the genus *Cerace* and its allies were puzzled by their appearance and characters and could reach no agreement upon the true position of these insects within the Microlepidoptera. Consequently Walker and Moore, who were the first to recognize the true Tortricoid relationship of *Cerace*, put this genus in the family Tortricidae; Snellen thought it to be a Tineid; Meyrick regarded *Cerace* originally as belonging to Plutellidae, founded the family Ceracidae afterwards, but later on suppressed it again and placed *Cerace*, together with *Pentacitrotus* (which he regarded only as a synonym), in the Tortricidae. The latter genus was described by Butler as belonging to Lithosiidae; Warren was of the same opinion. Later on Filipjev described the genus *Eurydoxa* as a Tortricid, of which Matsumura's *Ceraceopsis* is a new synonym.

Originally the author shared Meyrick's opinion and regarded *Cerace* and *Pentacitrotus* as belonging to the family Tortricidae but separated them in a subfamily, for which he proposed the name of Ceracidii. Further study convinced him, however, that this situation could not be maintained. In the present paper he proposes to re-establish Meyrick's family Ceracidae, which represents a very distinct, natural group of insects, being a quite independent member of the superfamily Tortricoidea.

A considerable amount of material, which has been put at the author's disposal by the authorities of the British Museum (Natural History), supplemented by some specimens from the Leiden Museum and the Muséum National d'Histoire Naturelle in Paris, from the collection of Mr. T. Bainbrigge Fletcher, and from the author's own collection, enabled him to revise the present group. A new genus, eight new species, and ten new subspecies are described. One species is re-established and one abandoned. Three species, viz. *Cerace loxodes* Meyrick and *C. mesoclasta* Meyrick, of which the types possibly are in the Indian Museum, Calcutta, and *Eurydoxa advena* Filipjev, of which the type is in the Museum of the Leningrad Academy of Sciences, could not be studied at present.

The author is greatly obliged to the authorities of the British Museum, and of the Leiden and Paris Museums, for the loan of valuable material, and also to Mr. W. H. T. Tams, British Museum, for his kind help and information, and also for the photographs of type specimens at that museum and to Mr. T. Bainbrigge Fletcher, Stroud, England, for valuable information on literature and for the loan of the material from his collection.

KEY TO THE FAMILIES OF TORTRICOIDEA

1. Basal segment of antenna without pecten 2
 Basal segment of antenna with pecten MELANALOPHIDAE
2. Head smooth; flattened tuft on vertex encircling base of antennae which are approximated; eyes protruding; palpi porrect, little dilated, terminal segment very short CERACIDAE
 Head with appressed scales; if rather smooth then palpi dilated posteriorly with rough projecting scales above and beneath or palpi long 3
3. Fore wing with vein 2 from beyond $\frac{3}{4}$ of cell PHALONIIDAE
 Fore wing mostly with vein 2 from before $\frac{3}{4}$ of cell¹ 4
4. Hind wing with basal pecten of hairs on lower margin of cell EUCOSMIDAE
 Hind wing mostly without such pecten² 5
5. Fore wing with veins 8 and 9 stalked or coincident; hind wing with vein 5 parallel, 6 and 7 stalked CHLIDANOTIDAE
 Fore wing with veins 8 and 9 rarely stalked; if thus, then hind wing with vein 5 approximated to 4 at base TORTRICIDAE

Family CERACIDAE (Meyrick)

Tortricidae, Walker, 1863, *List Lepid. Ins. Brit. Mus.* **28**: 422. Moore, 1888, *Descr. Lepid. Atkinson*: 279. Meyrick, 1912, in Wagner, *Lepid. Cat.* **10**: 15; 1913, in Wytsman, *Gen. Ins.* **140**: 20 (Group B, pro parte).

Lithosiidae, Butler, 1881, *Ill. Lepid. Heter. Brit. Mus.* **5**: 35. Warren, 1888, *Trans. Zool. Soc. Lond.*: 295.

Lithosiinae (subfam.), Cotes & Swinhoe, 1889, *Cat. Moths India*: 733.

Ceracinae (subfam.), Cotes & Swinhoe, 1889, *Cat. Moths India*: 699.

Tineina, Snellen, 1903, *Tijdschr. Ent.* **46**: 26.

Plutellidae, Meyrick, 1907, *J. Bombay Nat. Hist. Soc.* **17**: 748.

Ceracidae, Meyrick, 1908, *Rec. Indian Mus.* **2**: 395.

Ceracidii (subfam.), Diakonoff, 1939, *Zoöl. Meded.* **21**: 128.

Head smoothly scaled, face smooth, vertex in both sexes, especially in ♂, with a thick, smooth tuft of long hairs partially encircling the base of each antenna, flattened or separated in middle of vertex. Eyes considerably protruding. Ocelli moderate, posterior. Antenna $\frac{1}{3}$ – $\frac{1}{2}$, scape short and stout, with very short smooth scales, without pecten, scapes considerably approximated to each other on top of vertex in ♂, less distinctly so in ♀; flagellum slender, fasciculate-ciliate in ♂, cilia curved, minutely pubescent in ♀. Proboscis short. Maxillary palpi obsolete. Labial palpi short, mostly stout, porrect or subascending, mostly somewhat curved, median segment thickened with scales, roughly projecting along lower edge, terminal segment very short, obtuse, roughish. Thorax smoothly scaled, without crest, tegulae edged with rough, projecting scales. Abdomen rather long. Legs strong, smoothly scaled, inner posterior spurs long. Fore wing without costal fold in ♂, elongate-ovate or elongate-truncate, often with a rectangular notch at apex on vein 7. All veins separate: 1b furcate, furca mostly very long, 2 from beyond $\frac{1}{2}$ to before $\frac{3}{4}$, 3 from angle, 3–5 remote, 6 more remote from 5, parallel, 6–8 more or less approximated

¹ Except *Crothaema* Butler (Madagascar) and *Mimeoclysia* Diakonoff (Java).

² Except *Sparganthis* Hübner (Palae- and Nearctic) and allied genera.

towards base, considerably diverging posteriorly, 7 to termen or apex, 10 remote from 9, 11 from beyond $\frac{1}{3}$ of cell; mostly two accessory cells developed: upper parting vein from half-way between 11 and 10 to between 9 and 8, to the base of 8, or to between 8 and 7; second parting vein straight from base of upper edge of cell to between 4 and 5. Hind wing $\frac{3}{4}$, without cubital pecten, broad, ovate, or subtrapezoid; 1a simple, 1b shortly furcate at base, 1c partially weak, 2 from $\frac{1}{2}$ to $\frac{2}{3}$ of lower edge of cell, seldom 3 from angle and 4 approximate at base, mostly 3 and 4 connate from angle, or shortly stalked or 4 absent; 5 approximate at base, 6 and 7 more or less closely approximate towards base or even coincident along basal $\frac{1}{6}$, 8 separate, long, straight; discoidal vein inwardly angulate, often obliterate in middle, parting vein mostly developed, to the middle of discoidal, furcate at distal end.

Male genitalia with tegumen moderate, uncus long, pointed and hairy beneath distally, gnathos strong, hook-shaped, socii mostly large, drooping, bristly. Valva simple, semiovate or elongate-truncate, mostly densely bristled along harpe and cucullus. Aedoeagus curved and narrow, or straight and cylindrical; cornuti sometimes present: numerous spines. The 7th abdominal segment in female is mostly strongly sclerotized and its posterior edge is often deeply emarginate on the ventral side; by this emargination the ostium becomes very wide and the ventral appendages of the anapophyses form a sclerotized transverse band *above* the ostium, and not, as usually is the case in the family Tortricidae, *below* the ostium. For this part in the latter family the author proposed the name of *limen* (= threshold), which seems to be less well chosen in the case of Ceracidae. However, this name is retained here, as this part is, without doubt, homologous with the limen in Tortricidae. The shape of this transverse band is useful for the separation of species; it acquires in the genus *Pentacitrotus* a considerable development; ostium funnel-shaped, signum mostly a moderate scobinate curved plate at the base of ductus bursae.

The family is a natural group of multicoloured big moths of typical habitus. According to the venation they are related to the Tortricidae, but in other respects they differ so considerably from them that the separation into an independent family within the superfamily Tortricoidea seems necessary. The history of the family is mentioned above.

The peculiar habitus of head—with the bases of antennae approximated and encircled by long hairs of the flattened tuft on vertex—uniform obtuse scarcely dilated palpi, the large protruding eyes, the shape of fore wing, the colouring of hind wing and characteristic genital features show clearly enough that we have to do with a homogeneous and distinct off-shoot of the Tortricoid branch. Rather primitive genital structures, coupled with the bright colouring of both fore and hind wing and the smooth head can possibly be regarded as archaic features, pointing towards some ancestors common with Glyphipterygidae, while the 'simplified' neurulation shows considerable specialization parallel with the higher—but not the highest—Tortricidae. Contrary to Meyrick's opinion, the present family has no connexion whatsoever with the highly developed Tortricid genus *Zacorisca* Meyrick and allies, of which the ♂ genitalia are specialized in the extreme. Affinity with the South American Tortricid genus *Atteria* Walker and allies is probable; in that case the latter group of genera may form the connexion between Ceracidae and Tortricidae.

The life-history is known of only one species, *Bathypluta triphaenella* (Snellen), of which the larvae, injurious to the tea-plant and to the Cinchona-tree in Java, have been reared. Figures of these larvae were drawn on posters of the Institute for Plant Diseases, Buitenzorg. A description of the larval stages has never been published, however, and it is not possible for the author to obtain any material for study at present. Another species, *Pentacitrotus quercivorus* sp. nov. has been bred once from *Quercus semicarpifolia* in Himalaya.

The family Ceracidae has a limited distribution (Fig. 1): it is typical for central Asia from Kashmir to Burma and from Bengal to Ussuri, China, Japan, and Formosa, with a single straggler in North Borneo and Java. There is little doubt that the family will also be found in Sumatra.

The discrimination of the four genera mentioned below is easy and is based on constant characters, viz. shorter or longer furcation of vein 1b, position of vein 7 in fore wing, and presence or absence of vein 4 in hind wing, supported by the habitus and the genital characters of the species. *Pentacitrotus* must be regarded as a primitive form from which *Eurydoxa* and *Cerace* may have developed, the latter genus being the most specialized one. The rather numerous species of *Cerace* may be arranged in order of the development of this genus, of which the most characteristic tendency is the formation of a notch in the margin of fore wing on vein 7; furthermore in a change of the shape of wing, which becomes narrower and longer, the length of terminal veins increasing accordingly, parallel with the extremely long furcation of vein 1b. The genitalia show a development from a rather narrow, truncate little bristled valva with a thorn on the sacculus, towards a valva which is broad, densely bristled along cucullus and harpe, and has an unarmed sacculus. The arrangement here commences with *tetraonis* Butler as the primitive extreme and ends with *sardias* Meyrick, as the most specialized species, which shows a distinct relation with the fourth specialized and decadent genus *Bathypluta*, with small socii and atrophied signum.

KEY TO THE GENERA OF CERACIDAE

1. Hind wing with vein 4 absent (seldom present, then distinctly stalked with 3).
Socii small. Signum absent *Bathypluta*
Hind wing with vein 4 present, separate, or connate with 3. Socii moderate.
Signum present 2
2. Fore wing with apex rounded, indefinite, vein 7 to apex or costa, veins 9 and 10 distinctly converging posteriorly *Pentacitrotus*
Fore wing with apex rectangular or notched, vein 7 to termen, veins 9 and 10 parallel or slightly diverging posteriorly 3
3. Fore wing with vein 1b furcate over not more than $\frac{1}{4}$ of its length *Eurydoxa*
Fore wing with vein 1b furcate over more than $\frac{1}{4}$ of its length *Cerace*

Genus PENTACITROTUS Butler

Pentacitrotus Butler, 1881, *Ill. Lepid. Heter. Brit. Mus.* 5: 35, pl. 86, fig. 5 (descr.). Warren, 1888: *Proc. Zool. Soc. Lond.* 295. Diakonoff, 1939, *Zoöl. Meded.* 29: 132, figs. 1D-G, 2D (descr. generic charact. and genitalia ♂, ♀).

Fig.1. DISTRIBUTION OF THE FAMILY CERACIDAE

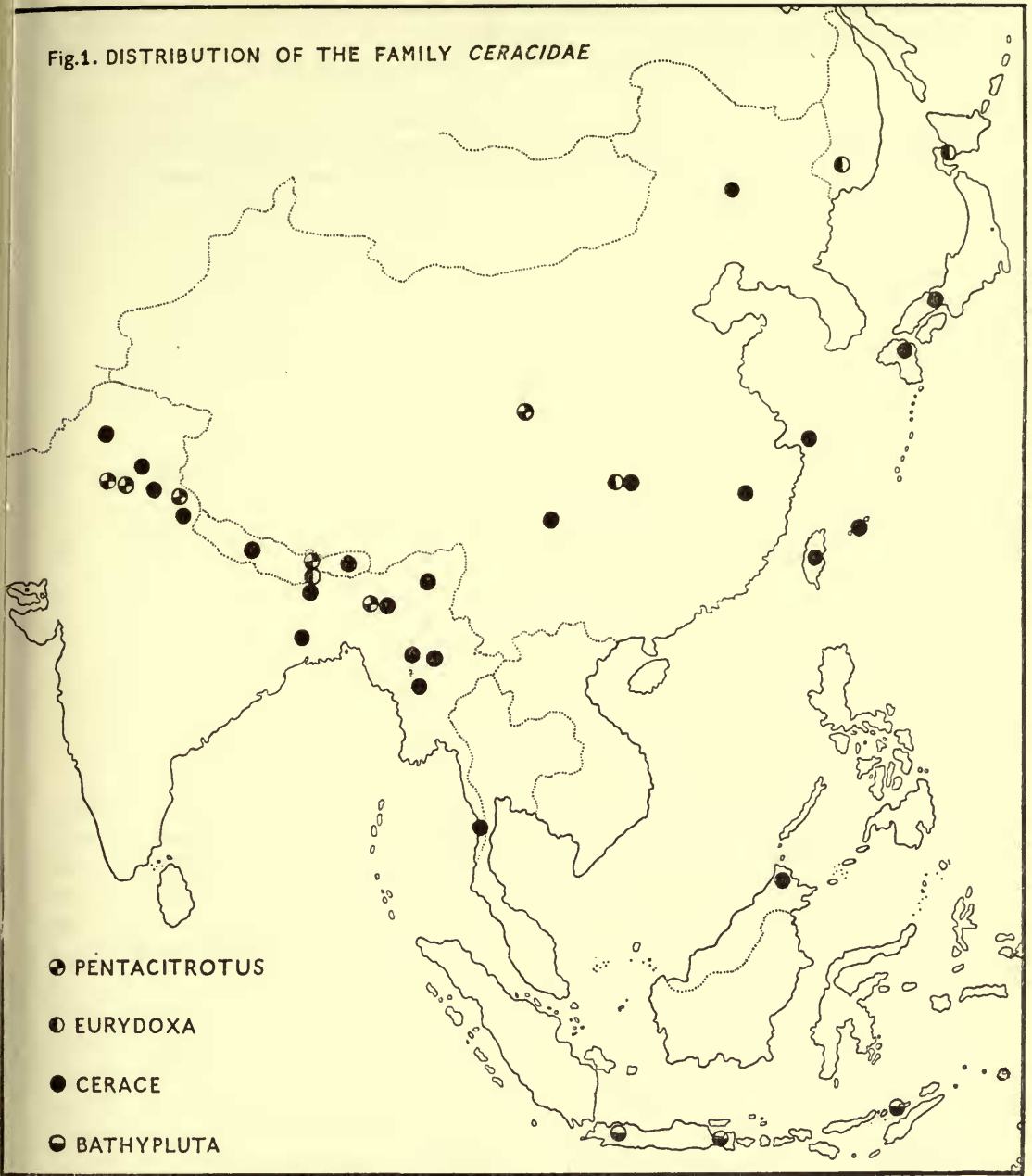


FIG. 1. Distribution of the family *Ceracidae*.

Cerace, Meyrick, 1912, in Wagner, *Lepid. Cat.* **10**: 15; 1913, in Wytzman, *Gen. Ins.*, **149**: 20.

Fletcher, 1929, *Mem. Dep. Agric. India Ent.* **11**: 43.

Type species: *Pentacitrotus vulneratus* Butler.

Head (Fig. 2) smooth, a small, smooth tuft of scales on vertex, divided in middle, enveloping scape of each antenna; scales of collar narrow, hair-like. Ocelli posterior. Proboscis short. Antenna $\frac{1}{2}$, slender, scape short and stout, smoothly scaled, flagellum fasciculate—ciliated in ♂ (ciliations 3), shortly pubescent in ♀. Palpus in ♂ very short,

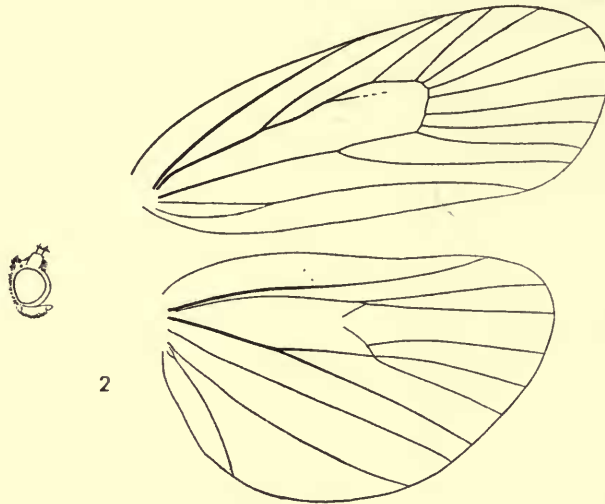


FIG. 2. *Pentacitrotus vulneratus* Butler ♂, wing neuration and head.

porrect, slightly curved, median segment rather slender, little thickened in middle, curved, with roughly appressed scales somewhat projecting along lower edge; terminal segment very short, obtuse, with appressed scales; in ♀ a little longer, lower edge of median segment longer, bluntly pointed. Thorax and legs smoothly scaled. Fore wing (Fig. 2) elongate-ovate, dilated posteriorly, with costa curved throughout, apex broadly rounded, indefinite, termen curved, oblique. 1b furcate to before $\frac{1}{3}$, 2 from $\frac{2}{3}$ of lower edge of cell, 3 from angle, separate and almost parallel with 4, 5-6 almost parallel, 6 nearer to 7 than to 5, 7 to apex or costa (?), 7-9 equidistant, strongly diverging posteriorly, 10 remote, from $\frac{2}{3}$ between 9 and 11, 11 from a little before middle of cell. Upper parting vein in ♀ from beyond half-way between 11 and 10, weak posteriorly, traceable to between 7 and 8, in ♂ obliterate except at base. Lower parting vein in ♀ weak, obliterate anteriorly, appearing distinctly beyond middle of cell, running to base of vein 5, in ♂ scarcely traceable. Hind wing without cubital pecten, broadly semiovate in ♂, ovate-subtrapezoid in ♀, apex broadly rounded. 1b shortly furcate, 2 from a little beyond $\frac{3}{8}$, 3 and 4 mostly connate from angle (in one specimen remote, in another shortly stalked in right wing, connate in left), 5 approximated at base, 6 and 7 separate, diverging in ♂, more or less approximated along basal $\frac{1}{4}$ in ♀.

KEY TO THE SPECIES OF *Pentacitrotus**Males*

Hind wing crimson-orange, black marginal band continuous

vulneratus vulneratus

Hind wing orange-yellow, black marginal edge with a yellow streak on vein 1b

*vulneratus distinctus**Females*

1. Fore wing with two continuous transverse black fasciae connected in disk. 2
Fore wing with only one transverse fascia, other interrupted or reduced to dots 3
2. Abdomen light ochreous. Anal half of wing pale ochreous *quercivorus*
Abdomen blackish, with orange rings, half of hind wing black
vulneratus congruens
3. Fore wing with transverse fascia narrow, oblique, hind wing dark orange
vulneratus vulneratus
Fore wing with transverse fascia broad along basal $\frac{2}{3}$, hind wing orange-yellow 4
4. Indian species. Hind wing with black markings *vulneratus distinctus*
Chinese species. Hind wing without black markings *aeneus*

***Pentacitrotus quercivorus* sp. nov.**

♀ 26 mm. Head, antenna, palpus, and thorax greyish-black with leaden-metallic sheen, except palpus and antenna, the latter faintly suffused with light grey above, patagium whitish anteriorly, thorax dark grey with long, white hairs below. Abdomen evenly ochreous above, dark brown with posterior edge of segments narrowly pale ochreous below. Legs dark grey, whitish below and around articulations. Fore wing elongate-ovate, rather broad, dilated posteriorly, broadest at $\frac{2}{3}$, costa gradually arched throughout, apex and termen broadly rounded, the latter little oblique. Black, markings light orange-pinkish, extended, edged at a short distance with shining violet-metallic lines. Basal patch from base of costa very oblique, almost reaching dorsum, its top rounded; costal patch broader, erect-semicircular, on second fifth of costa, reaching half-way across cell; dorsal patch as broad as basal, before middle of wing slightly inwardly oblique, its edges parallel, its top rounded to above middle of cell; apical area with anterior edge from costa beyond middle of wing to dorsum before tornus, vertical above, oblique and concave beneath; a rather narrow marginal streak of ground colour from end of vein 10 to end of vein 5; a round black dot on middle of veins 5-6. Cilia dark grey, apex suffused with white, base black. Hind wing yellowish-orange, anal half pale ochreous; an irregular blackish apical patch, somewhat suffused posteriorly and connected with wing edge; a large ovate pale grey preterminal patch between vein 3 and fold; base of fold and vein 1b to before wing edge each with a diffuse streak of pale grey. Cilia pale yellow.

7th and 8th abdominal segments (Fig. 3) little sclerotized. Ostium: an oblique funnel, above this two lateral lobes; limen: a plate with a blunt median lobe and large lateral concave lobes. Ductus bursae moderate, narrow, weak. Bursa copulatrix

moderate elongate-pear-shaped, curved, weak; signum an ovate plate with curved, slightly scobinate edges, at upper $\frac{1}{4}$ of bursa (slide No. 599 D., type).

NE. HIMALAYA, Deobar, larva on *Quercus semicarpifolia*, 10.vii.1902. Moth emerged in the beginning of viii.1902. (E. P. Enkling, Wals. Coll.). 1 specimen, closely allied to the following, but quite distinct in the colouring of abdomen and hind wing and in genitalia. Type in the British Museum (Nat. Hist.).

Pentacitrotus vulneratus Butler

Pentacitrotus vulneratus Butler, 1881, *Ill. Lepid. Heter. Brit. Mus.* **5**: 35, pl. 86, fig. 5 (♂).

Warren, 1888, *Proc. Zool. Soc. Lond.*: 295 (♂ redescr., ♀ descr.). Cotes & Swinhoe, 1889, *Cat.*

Moths, India: 733. Diakonoff, 1939, *Zoöl. Meded.* **29**: 132, figs. 1D-G, 2D (general charact. descr. genit. ♂, ♀).

Cerace vulnerata Butler, Meyrick, 1912, in Wagner, *Lepid. Cat.* **10**: 15; 1913, in Wytzman, *Gen. Ins.* **149**: 20.

♂ 23-25 mm. Head and thorax dark grey with leaden-greenish metallic sheen; collar of narrow blackish hair-scales, patagium white anteriorly; tip of metathorax dark orange. Antenna dark grey, above whitish, black-ringed. Palpus dull dark grey. Abdomen greyish-brown, posterior edge of segments with a narrow yellowish-ochreous band, ventral surface light grey, bands white, anal tuft and valva light grey. Legs dark grey, all segments with white apical rings. Fore wing elongate-ovate, dilated posteriorly, broadest at $\frac{3}{4}$, costa gradually curved from base to apex, apex broadly rounded, indefinite, termen broadly rounded, little oblique. Purple-black with greenish sheen, markings bright orange, crimson-orange or crimson, edged at a short distance with shining leaden-greenish and violet lines except in centre of disk: an oblique blotch on basal $\frac{1}{6}$ of costa, its top rounded, not reaching base; a semi-circular patch on $\frac{1}{3}$ of costa, as broad or a little broader than preceding; a somewhat narrower slightly inwardly oblique patch on dorsum before middle, its base slightly narrowed, its top rounded reaching above middle of disk; an oblique broad band from $\frac{2}{3}$ of costa to lower half of termen, narrowed on costa, its anterior edge convex above and beneath, with a deep knob-shaped emargination in middle, which almost interrupts the band, or forms an ovate black dot, connected with the ground colour by a narrow stalk; its posterior edge convex, leaving a narrow streak of ground colour along posterior part of costa, apex, and upper part of termen; a faint suffusion of metallic-lilac scales on dorsal and upper pre-apical orange marks. Cilia dark grey with two blackish lines, white at apex. Hind wing yellowish-orange or reddish-orange, a brownish-black band along apical and terminal $\frac{1}{2}$ - $\frac{1}{4}$ and along anal $\frac{1}{2}$ of wing, not reaching lower edge of cell, its anterior edge sometimes faintly projecting on veins, convex between these; sometimes a clavate streak of ground colour along basal $\frac{3}{4}$ of vein 1b, narrow, suffused patches of ground colour on end of veins along apex and termen. Cilia orange or crimson-orange, pale yellow towards base.

Tegumen (Fig. 5) erect, uncus moderate, strong, acutely pointed with a few short, fine bristles on outer side. Gnathos rather short, angularly bent in middle, with long, strong point. Socii broad, as long as gnathos. Valva short, truncate, considerably narrowed posteriorly, a patch of long, thick bristles on harpe and along cucullus.

Sacculus narrow, bristled. Transtilla absent. Aedoeagus rather small, tubular, apex thick, chitinized. (Slide No. 123 A.D. = No. 1186 B.M.; No. 597 D.)

♀ 27–35 mm. Head (Fig. 2), and thorax without greenish-metallic sheen, blackish-purple or greyish-black. Abdomen as in ♂. Fore wing (Fig. 2) pale ochreous-lilac or orange-lilac, sometimes somewhat suffused with greyish-lilac posteriorly, markings (being reduced ground colour of ♂) black, with narrow metallic-greenish lines along edges, considerably varying, mostly as follows: a somewhat curved transverse band from $\frac{1}{5}$ of costa to $\frac{2}{5}$ of dorsum, connected by a narrow line along dorsum with base of wing, sometimes broad and vertical along lower $\frac{2}{5}$, oblique and narrow above, sometimes connected with an erect transverse small patch just before middle of costa reaching to upper edge of cell, sometimes this patch reduced to a subtriangular dot not reaching costa; a subquadrate or triangular erect patch at $\frac{3}{4}$ of dorsum; sometimes a small dot in disk between this and costal patch; a round pre-apical dot on middle of vein 4; a narrow marginal line from end of vein 11 to end of vein 4, sometimes almost obliterate. Sometimes markings as in ♂, but orange markings extended. A small suffusion of shining opalescent scales on middle of fold and on upper angle of cell. Cilia glossy greyish-orange, white around apex. Hind wing crimson-orange, bright yellow-orange, or dark orange. Markings brownish-black, varying: a clavate suffusion along vein 1b, often connected with a larger ovate premarginal patch on vein 2; a more or less suffused erect pre-apical patch connected in middle with apical edge, sometimes reduced to a small dot.

7th ventrite (Fig. 4) entirely strongly sclerotized. Ostium: an obliquely compressed funnel, limen with a pointed median projection and an ovate lateral plate at each side, each crowned with a strong, concave pointed body. 8th segment sclerotized, cylindrical. Ductus bursae long, weak, its wall finely scobinated towards end, bursa copulatrix ovoid, signum a moderate elongate plate with edges curved downward. (Slide No. 1218 B.M., No. 598 D.)

Holotype ♂ (Butler) and allotype ♀ (Warren) in the British Museum (Nat. Hist.).

The following distinct forms possess identical genitalia and are described as varieties:—

***Pentacitrotus vulneratus distinctus* var. nov.**

♂ 25 mm. Tegula black, fore wing rather broad, markings orange, tinged crimson. Hind wing yellow-orange, a yellow clavate streak on vein 1b.

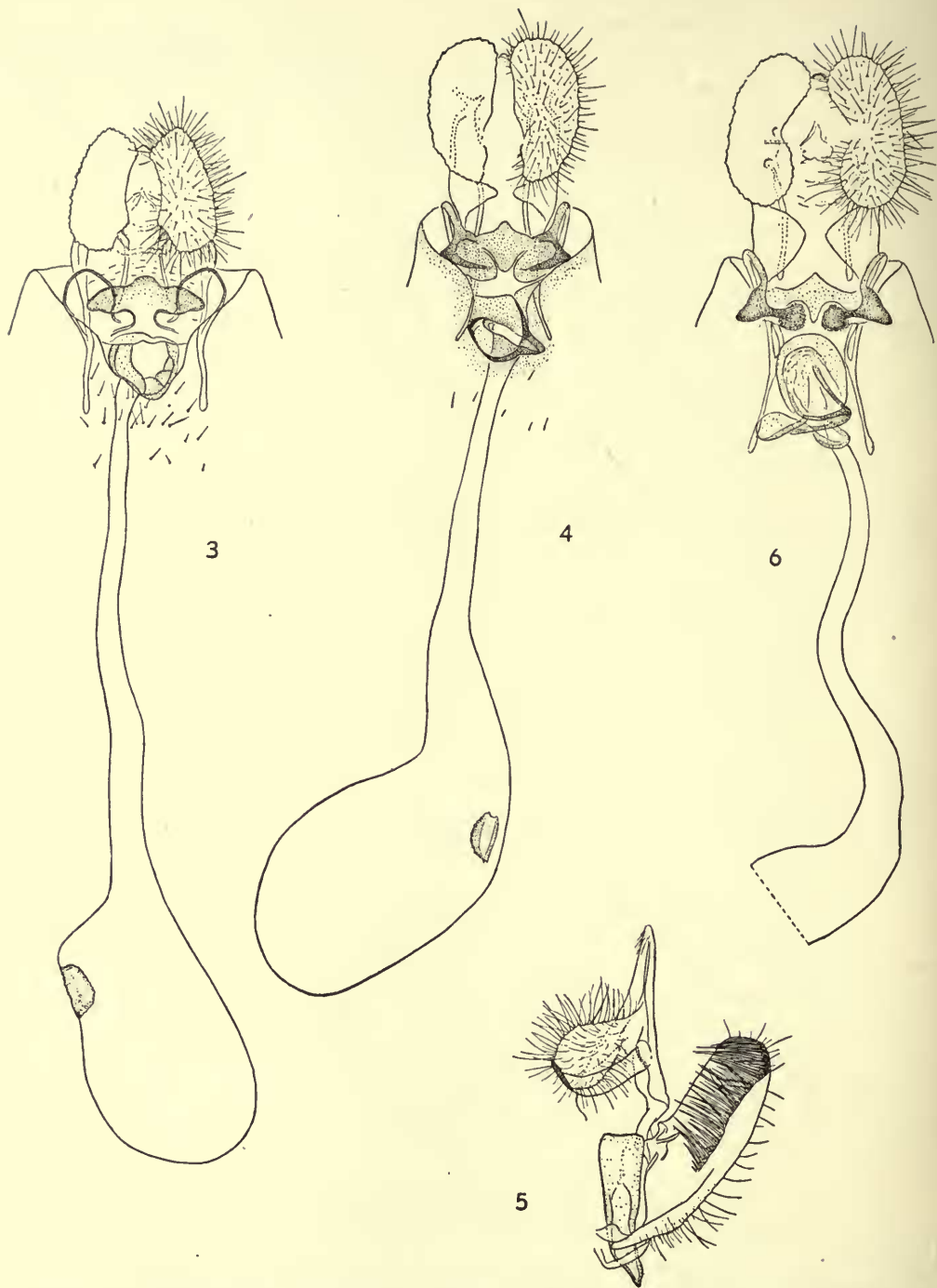
♀ 29–35 mm. Tegula black, fore wing broad, pale ochreous-lilac, dark markings broad, coarse: costal patch before middle of costa, erect, sometimes connected with transverse fascia. Hind wing orange-yellow, pre-apical patch large, erect.

INDIA, Punjab: Thundiani, 86, 128, 10.x.83 (206): 1 ♀ (Warren's allotype). Kulu District (Crowley Coll.): 1 ♂, 1 ♀. (In the British Museum (Nat. Hist.).)

***Pentacitrotus vulneratus congruens* var. nov.**

♀ 31 mm. Tegula black, fore wing with markings as in ♂ of the type, but somewhat more extended, orange-crimson. Hind wing dark orange, anal half from base to costa beyond apex black, a dark orange triangular marginal patch above middle of termen.

INDIA. 1901 (*H. J. Elwes*). 1 specimen in the British Museum (Nat. Hist.).



FIGS. 3-6. Genitalia of *Pentacitrotus*: 3. *P. quercivorus* n. sp., ♀. 4. *P. vulneratus* Butler, ♀. 5. *P. vulneratus* Butler, ♂. 6. *P. aeneus* Leech, ♀.

Pentacitrotus vulneratus vulneratus Butler

♂ 23 mm. Tegula black, fore wing and hind wing with ground colour dark orange-crimson, dark band in hind wing not interrupted on vein 1b.

♀ 28-30 mm. Tegula pinkish-lilac. Fore wing pinkish-lilac, darker than in preceding and narrower, with transverse fascia narrow. Costal patch reduced to a subtriangular subcostal dot before $\frac{1}{2}$, pre-apical dot small, apical line almost obliterate. Hind wing dark orange, markings narrow, blackish-grey: a narrow streak along vein 1b, sometimes absent, sometimes connected with elongate preterminal dot, pre-apical dot very small.

INDIA, Assam, Khasia Hills, vi.1895; Sikkim, v.1889 (*Dudgeon*): 2 ♂, 4 ♀. (Holotype from Darjeeling and allotype in the British Museum (Nat. Hist.).)

Pentacitrotus aeneus Leech

Pentacitrotus aeneus Leech, 1890, *Entomologist*, **23**: 83.

♀ 32 mm. Head, palpus, and thorax blackish-purple, shining (antennae missing). Abdomen blackish, a narrow posterior band along every segment orange. Legs black, faintly ringed white (damaged). Fore wing rather broad, dilated posteriorly, costa considerably curved at base, less curved posteriorly, apex broadly rounded, indefinite, termen strongly curved, oblique beneath. Light pinkish-orange, opalescent with lilac. Markings black, edged with greenish shining scales. Transverse band from $\frac{1}{3}$ of costa to about $\frac{1}{3}$ of dorsum, oblique, narrow along upper half, broader, vertical along lower half, an angulate projection on posterior edge below middle; base of transverse band connected by a narrow black line along dorsal edge with base of wing; costal patch at $\frac{1}{2}$, erect, somewhat inwardly oblique; dorsal patch below end of cell, subquadrate; pre-apical dot moderate, round, between veins 4-6; a narrow marginal line from base of vein 10 to beyond base of vein 5. Cilia dark grey, whitish around apex. Hind wing bright yellow, basal half of vein 1b narrowly suffused with black. Cilia yellow (damaged).

7th and 8th abdominal segments (Fig. 6) considerably sclerotized. Ostium a wide, oblique funnel. Median plate above this little sclerotized with long, bluntly pointed lateral projection, followed by a rather narrow pointed lobe. Ductus bursae weak. Bursa copulatrix damaged (signum missing). (Slide No. 600 D., type.)

CENTRAL CHINA, Chang Yang, Hoope. vi.1888 (*A. E. Pratt*). Leech 62352. 1 specimen. According to the label this must be the type specimen, on which Leech's description of *Pentacitrotus aeneus* was based. This description is followed by the remark: 'One male example taken in June at Chang Yang. A female specimen of this species from Darjeeling in the British Museum (Nat. Hist.) has the band on the primaries interrupted.'

As to this the following remarks can be made. The *Pentacitrotus* species from China was represented by a unique specimen, Leech's holotype of his *aeneus*. According to the label we have this type specimen before us. However, this is not a ♂, but a ♀, and furthermore, it does not agree with Leech's description! Leech described obviously a ♀ of *Pentacitrotus vulneratus* from India. As no more material from China except this unique specimen is known, and Leech cites the locality elaborately in his

description, we decided to describe this specimen but not to reject Leech's name, as a *nomen conservandum*.

As to the 'female specimen of this species from Darjeeling'—only one specimen of *Pentacitrotus* at the British Museum (Nat. Hist.) is known to the author from that locality, and that is Butler's type of *Pentacitrotus vulneratus*, a ♂.

Genus EURYDOXA Filipjev

Eurydoxa Filipjev, 1930, *C.R. Acad. Sci. U.R.S.S.* (A): 373-374, figs. 2, 3 (descr., ♀ neur.).
Ceraceopsis Matsumura, 1931, *6000 Illustr. Ins. Japan*: 1068. (Non descr. Type species: *sapporensis* Matsumura) *Syn. nov.*

Type species: *Eurydoxa advena* Filipjev, 1930.

Head (Figs. 7, 8) smooth, a smooth flattened tuft on vertex, encircling the base of antennae, divided in middle. Ocelli posterior. Tongue developed or rather short. Antenna $\frac{1}{2}$, in ♂?, in ♀ finely ciliate, sometimes thickened. Scape stout, short. Palpus short, porrect, median segment smooth above, with a rough fringe of scales below, longer in ♀, not thickened, terminal joint very short, obtuse. Thorax and legs smoothly scaled. Fore wing (Figs. 7, 8) without costal fold in male, broad, elongate-truncate, costa moderately or rather strongly curved at base, little curved posteriorly, apex shortly rounded, termen vertical, straight or little convex (in one species slightly concave above), little oblique beneath. All veins separate, 1b furcate along basal $\frac{1}{2}$ or to before $\frac{1}{4}$, 2 from $\frac{2}{5}$ — $\frac{3}{5}$, 3 from angle, 4 more or less approximated, 5 parallel, remote from 4, widely remote from 6 at base, mostly distinctly converging posteriorly, 7 to termen, 9-11 parallel, 11 from distinctly before middle of cell in ♂, from a little before middle in ♀, upper parting vein from between 10 and 9 to between 7 and 8, lower parting vein from base to between 4 and 5, sometimes weak, in ♂ indefinite. Hind wing broadly semiovate or subovate, without cubital pecten. 1b shortly furcate at base, 2 from beyond $\frac{1}{2}$ to $\frac{2}{3}$, 3 from angle, separate or connate with 4, 5 approximated at base, 6 and 7 more or less approximated towards base, 7 to apex, 8 long, free; parting vein weak, from base to angularly bent middle of discoidal vein, sometimes shortly furcate at apex.

KEY TO THE SPECIES OF *Eurydoxa*

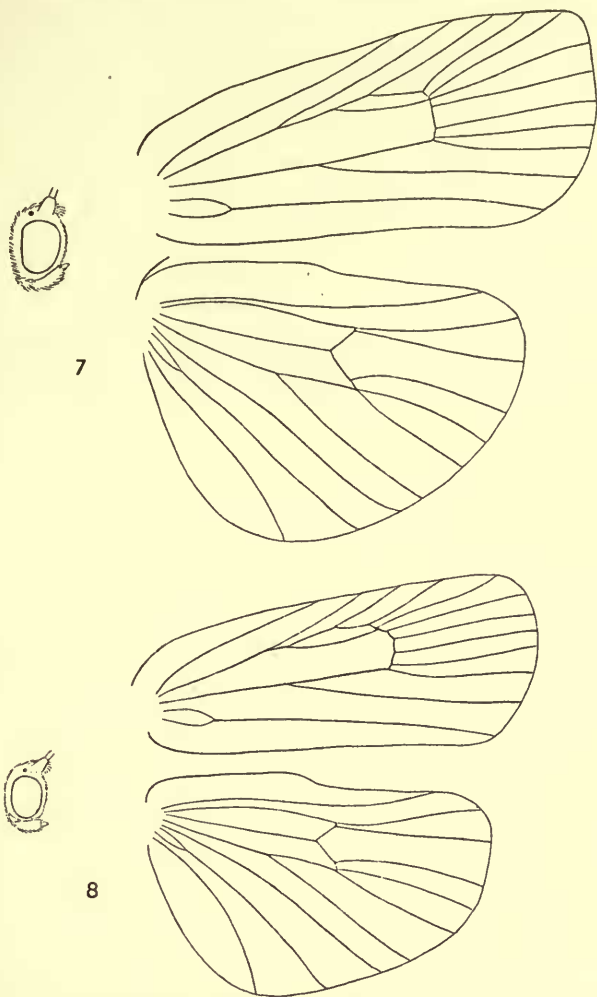
1. Hind wing white with black markings *tamsi*
 Hind wing not thus 2
2. Hind wing suffusedly black, a streak in disk, and markings between anal veins yellow *sapporensis*
 Hind wing brownish-grey with a suffused orange-pink subcostal spot at $\frac{2}{3}$ *rhodopa*
 Hind wing orange with numerous black dots *advena*

***Eurydoxa rhodopa* sp. nov.**

ῥόδεος = pink, *ὄφης* = eye.

♀ 29 mm. Head (Fig. 8) blackish-brown, vertex orange posteriorly. Antenna dark brown, black-ringed (damaged). Palpus straight, short, rather roughly scaled throughout, with a fringe of projecting scales along lower and apical edge but not dilated,

fuscous, terminal segment dark grey. Thorax blackish, patagium and tegula (damaged) orange. Abdomen dark brown, a long loose fringe of ochreous scales along posterior edge of segments. Legs dark brown, anterior suffused with ochreous; tarsi ringed with ochreous. Fore wing (Fig. 8) moderately broad, with upper parting vein to



FIGS. 7-8. Wing neuration and head: 7. *Eurydoxa sapporensis* (Matsumura), ♂.
8. *E. rhodopa* sp. n., ♀.

between veins 7 and 8, vein 1b furcate along $\frac{1}{4}$ of its length; costa strongly arched at base, gradually curved in middle, straight before apex, apex shortly rounded, termen straight above, convex beneath, vertical. Blackish-brown, very densely and regularly covered with numerous small round dots and along costa oblique transverse streaks ochreous-whitish, irregularly suffused with yellowish, with orange-pink and here and there with dark crimson; more distinct are a suffused streak below costa and a

rounded suffusion above middle of disk at $\frac{2}{3}$; a well-defined, orange-reddish, rather narrow terminal fascia from apex to above tornus. Cilia (damaged) black, with a white patch at apex. Hind wing dark bronze-brown, a somewhat suffused irregular patch below costa at $\frac{2}{3}$ of wing, and a narrow, irregular line before upper half of termen ending in a small apical patch orange-reddish. Cilia orange-reddish with dark brown basal half along apex and upper half of termen, dark brown elsewhere.

7th ventrite (Fig. 9) little sclerotized, its posterior edge straight. Anapophyses short. Limen considerably dilated towards middle, its anterior edge excavate, this excavation continued into thickened short curved rims, which form the lateral rim of the ostium. Postapophyses short, ovipositor lobes ovate, little dilated posteriorly. Ostium rather small, ductus bursae immediately beginning with a cylindrical colliculum, which is sclerotized and possesses a very strong refracting wall. Ductus bursae moderately broad elsewhere, simple, signum small, a rounded, convex plate with regular, small dentations. (Slide No. 582 D., type.)

CHINA, Tse-Kou, 1898 (*P. Dubernard*, Paravicini Coll.). 1 specimen. An early form according to the markings and the genitalia, with little affinity to the other species; structurally little diverging from the following. Type in the British Museum (Nat. Hist.).

***Eurydoxa sapporensis* (Matsumura)**

Ceraceopsis sapporensis Matsumura, 1931, 6000 *Illustr. Ins. Japan*: 1068, fig. 2129 (♂); 1932, *Insecta Matsumurana*, 6: 199.

♂ 35 mm. Head (Fig. 7) pale yellow, face and base of antennae edged with dark brown, collar laterally whitish, dorsally dark brown, mixed with yellow scales posteriorly. (Antennae missing.) Palpus blackish-grey, basal segment and fringe along lower edge of median white. Thorax blackish-brown, white from beneath, patagium mixed with pale yellow laterally, tegula edged with pale yellow, metathorax mixed with sparse, pale yellow scales. Abdomen blackish-brown, ventrally white, segments edged with yellow posteriorly, anal segment blackish. Legs with femora white, bases blackish, tibiae yellowish-ochreous, blackish from above except on apex, median tarsus blackish white-ringed, apical half of basal segment yellow, posterior tarsus dark grey, segments diffusely edged with ochreous, basal segment long. Fore wing (Fig. 7) with vein 1b furcate along basal $\frac{1}{2}$, upper parting vein ending almost at base of vein 7, lower parting vein indistinct; elongate-truncate, rather broad, gradually dilated posteriorly (broadest at $\frac{5}{8}$), costa abruptly considerably arched at base, straight to $\frac{3}{4}$, convex there, straight before apex, apex shortly rounded, termen straight and vertical in front, gradually rounded and little oblique behind. Brownish-black with a faint coppery gloss, markings pale yellow: a series of oblique irregular transverse streaks on costa, some of them furcate (asymmetrical in right and left wing), others interrupted or dissolved into 2-3 small rounded dots; about 4 horizontal longitudinal rows of rounded dots, which decrease in size posteriorly; a somewhat curved elongate-ovate spot between veins 2-5 beyond $\frac{4}{5}$ of wing, followed by an ovate bright orange spot before $\frac{3}{4}$ of termen, connected by a short yellowish projection at base with terminal edge; a small round orange dot before termen above tornus. Cilia

greyish-black with coppery gloss, a pale yellow dot on apex. Hind wing with veins 3 and 4 connate; broadly semiovate, dark blackish-brown, appearing darker where the spotted black markings of under side show through; markings orange-ochreous; a narrow streak with somewhat diffuse edges along lower edge of discal cell from base to $\frac{2}{3}$ of wing, dilated along apical $\frac{1}{3}$ with two dentations above and a few diffuse dots above these; a more or less interrupted narrow zigzag streak between veins 1b and 1c; a suffused and interrupted narrow preterminal streak; costa whitish. Cilia white, basal $\frac{1}{3}$ blackish, suffused with blackish-brown along dorsal $\frac{1}{3}$ of wing.

Tegumen (Fig. 12) short, broad. Uncus short, top rounded with a short patch of bristles on under side. Gnathos arms dilated at base, point curved, slender, long. Socii dilated, almost reaching the hook of the gnathos. Valva elongate-truncate, costa indefinite, cucullus slightly rounded, with dense long bristles which are continued in an oblique patch on harpe over $\frac{3}{4}$ of disk of the valva. Saccus rather narrow gradually dilated towards base, sclerotized, short-bristled, ill-defined posteriorly, ending in a short tooth. Juxta sclerotized. Anellus strong. Transtilla not perceptible. Aedoeagus hinge long. Aedoeagus very long, curved, strongly sclerotized, slender, with a lateral subapical tooth. (Slide No. 581 D.)

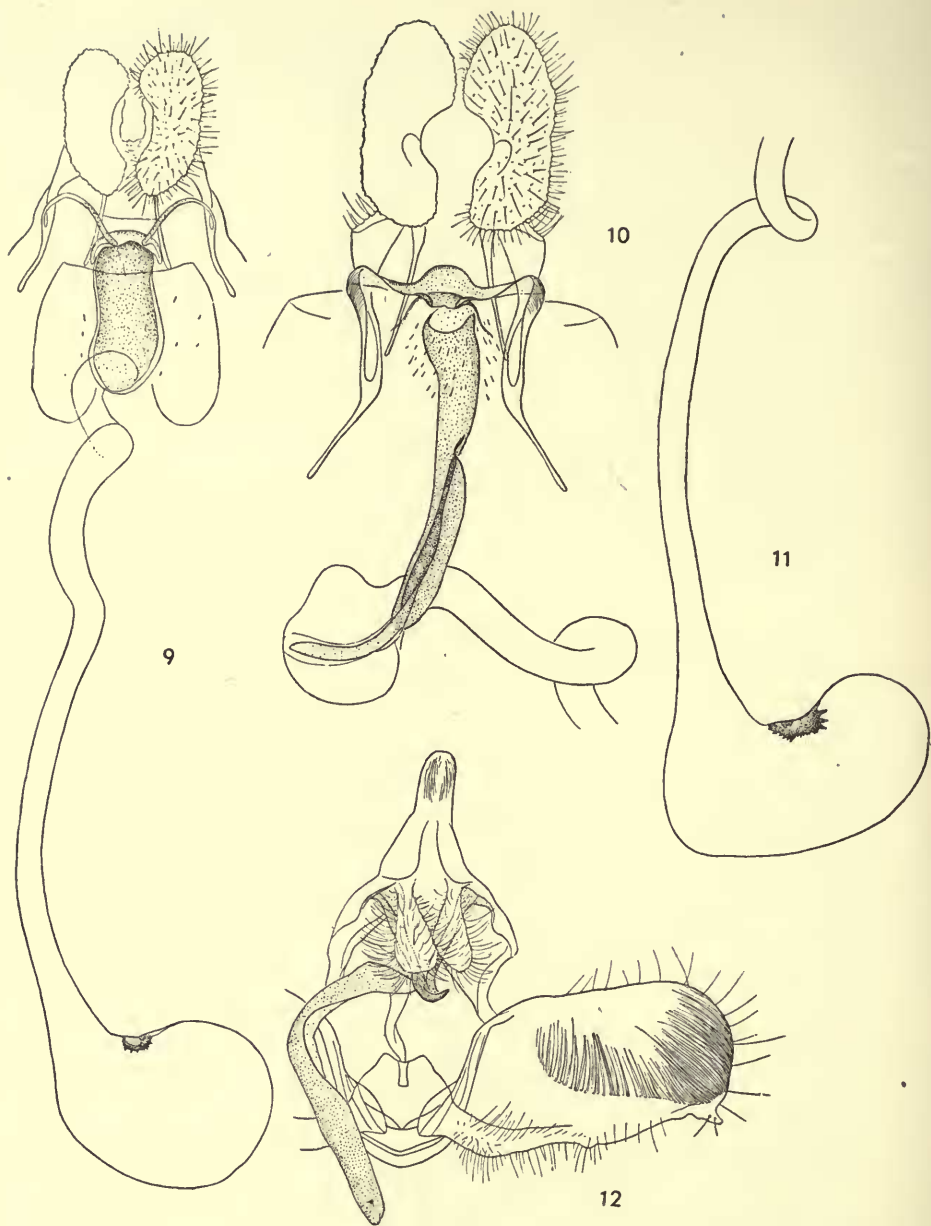
JAPAN, Jesso, Sapporo, 6.viii.1916 (*T. Issiki*), 1 ♂. Type location unknown.

Eurydoxa advena Filipjev

Eurydoxa advena Filipjev, 1930, *C.R. Acad. Sci. U.R.S.S.* (A): 374, figs. 1-3 (descr. fig. ♀, neur.).

The author has not seen this species. The description (in German) may be translated as follows:

40 mm. Head black, vertex between antennae and face sulphur-yellow, except a narrow black edge along eyes. Antenna thick, short (about $\frac{1}{2}$), scape very stout, black, very narrowly white-ringed. Tongue developed. Labial palpus small, black above, orange beneath. Thorax black, markings sulphur-yellow: distal parts of patagium, anterior edge of tegula, two minute dots on mesothorax, two somewhat larger dots on metathorax anteriorly and a few scales at its apex. Abdomen black, posterior part of segments orange, from ventral side orange colouring more extended, black colour almost entirely disappearing. Coxae and femora almost entirely orange, tibiae orange with black longitudinal markings, tarsi with basal segment black above, laterally and below orange, other segments black, orange-ringed. Fore wing black with sulphur-yellow dotting, which recalls that in *Cerace stipatana* Walker; costa with irregular transverse bands and dots; at base four longitudinal series of round dots, towards termen seven such series; the largest ones, in third row (from below), are larger than the dots in *stipatana*. Termen considerably less oblique than in *stipatana*. Erect preterminal orange patch from the end of vein 7 almost to tornus. Cilia short, black. Hind wing orange, dotted with black: a double row of dots along costa, less numerous anteriorly; two rows from edge to base between lower edge of cell and vein 1c and between 1c and 1b; towards base the dots melt into each other to form a continuous line, narrowed anteriorly between 1b and 1c. In cell 2 dots reach halfway across wing, in cells 3-6 halfway between edge and closing vein. Cilia orange, here and there suffused with black, towards base a weak antemedian line.



FIGS. 9-12. Genitalia of *Eurydoxa*: 9. *E. rhodopa* sp. n., ♀. 10. *E. tamsi* sp. n., ♀.
 11. *E. tamsi* sp. n., bursa copulatrix, less magnified. 12. *E. sapporensis* (Matsumura), ♂.

SIBERIA, Ussuri Mountains, Sutchan Region, 1,400 m., 11.vii.1928, in daytime in a forest of *Picea ajanensis* Fisch. and *Betula ermanni* Cham. (*A. Kuznezov*). The type specimen (unique) is probably in the Museum of the Academy of Sciences of U.S.S.R. in Leningrad. Obviously related to preceding.

Eurydoxa tamsi sp. nov.

♀ 47 mm. Head white, face (damaged) with a large, round purple-black spot in middle; collar black edged with white. Antenna with basal segment purple-black, shaft dark grey, faintly ringed white. Palpus with median segment long-fringed with rather rough hairs beneath, white, median segment above except at apex and terminal segment, which is very short, black. Thorax purple-black (rubbed off, probably with two pairs of lateral and one apical white spot); patagium purple-black, broadly edged with white. Abdomen whitish-yellow, tergites 1-4 purple-black with yellow posterior edge, tergites 5-7 with a pair of purple-black spots; each segment with a large ventrolateral spot; anal tuft brighter yellow. Legs pale yellow, tibiae with a black basal band, tarsi black with whitish rings on apex of segments. Fore wing with vein 1b with furca not reaching $\frac{1}{4}$ of its length, both parting veins present, upper ending between veins 7 and 8; costa moderately curved along $\frac{1}{2}$, straight in middle, faintly prominent at $\frac{3}{8}$, almost straight posteriorly, apex bluntly rounded, termen considerably convex, slightly emarginate on vein 6, rounded and rather oblique beneath. White, irregularly densely reticulate and striped with black, except in middle of disk, oblique transverse fasciae on costa, increasing in width posteriorly; terminal veins 4-6 black except at base; especially distinct: lower edge of cell with vein 3 and discal vein which is interrupted above middle; black colour more or less confluent and covered with horizontal rows of round white dots along dorsum, and terminal and apical $\frac{1}{2}$ of wing; a moderate, elongate irregularly ovate orange patch on termen between veins 2-5. Cilia black, glossy (damaged). Hind wing subovate, with veins 3 and 4 separate, veins 6 and 7 approximated towards base, but distinctly separate; white, apical and terminal $\frac{1}{4}$ as far as vein 1c dark grey, covered with diffuse, irregular black dots more or less indicating transverse bands; irregular black dots in cells as far as vein 1b, faint blackish suffusion on vein 1a. Cilia glossy, white, around dark area mixed with grey and dotted with black (damaged).

7th ventrite (Fig. 10) little sclerotized. Anapophyses short. Limen with a rounded dilation in middle. Colliculum a strong tube, slightly narrowed below, then obliquely truncate. Ductus bursae long, narrow. Bursa copulatrix (Fig. 11) boot-shaped, signum beyond the ostium of bursa: a stellate plate. (Slide No. 603 D., type.)

INDIA, Sikkim, Phedong (= Padong). (*R. P. Desgodins*, Paravicini Coll.). 1 specimen. Possibly this species will prove to be related to the foregoing, when the ♂ becomes known. Superficially it recalls *Cerace stipatana*. Type in the British Museum (Nat. Hist.).

Dedicated to Mr. W. H. T. Tams, British Museum (Nat. Hist.), out of gratitude for his interest in this revision.

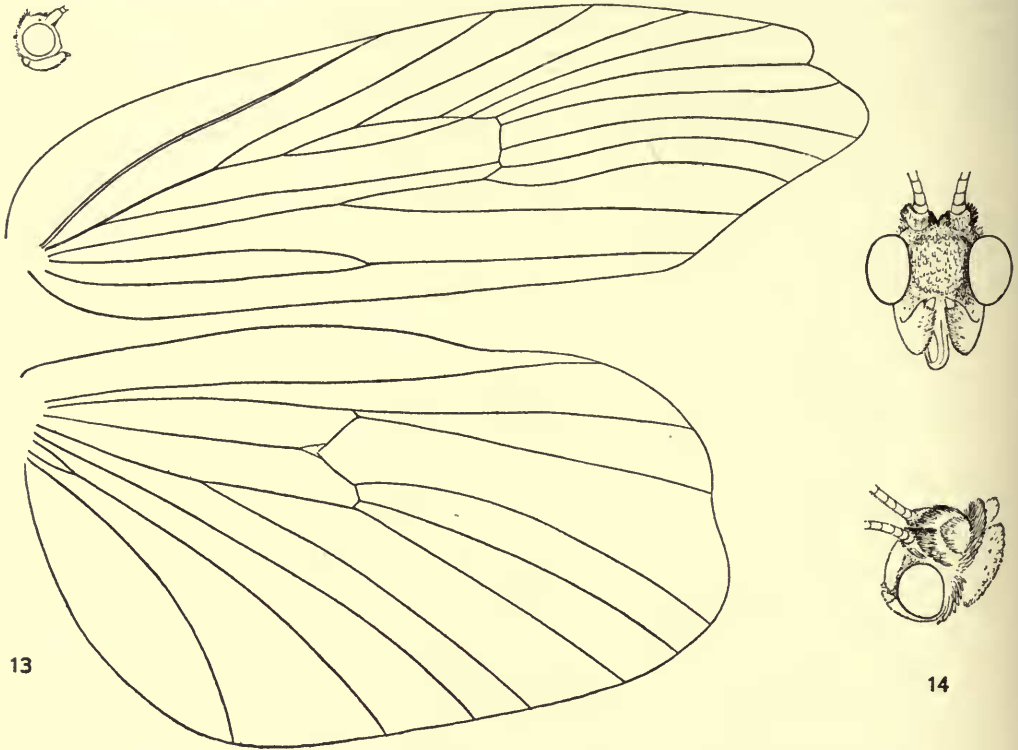
Genus CERACE Walker

Cerace Walker, 1863, *Cat. Lepid. Heter. Brit. Mus.* **28**: 422. Moore, 1888, *Descr. Lepid. Atkinson, Heter.*: 219. Cotes & Swinhoe, 1889, *Cat. Moths India*: 699. Walsingham, 1900, *Cat. Heter. Mus. Oxon.* **2**: 565. Meyrick, 1908, *Rec. Indian Mus.* **2**: 395; 1912, in Wagner, *Lepid. Cat.* **10**: 15; 1913, in Wytzman, *Gen. Ins.* **149**: 20. Fletcher, 1929, *Mem. Dep. Agric. India, Ent.* **11**: 43. Diakonoff, 1939, *Zoöl. Meded.* **21**: 130, figs. 1A-B, 2A-C.

Atteria Meyrick (*nec* Walker), 1910, *Proc. Linn. Soc. N.S.W.* **35**: 221.

Type species: *Cerace stipatana* Walker.

Head (Figs. 13, 14) smooth; a dense, smooth tuft on vertex encircling basal segments of antennae, flattened between these. Ocelli posterior. Tongue rather short.



FIGS. 13-14. *Cerace stipatana* Walker, ♀. 13. Wing venation and head.
14. Face and vertex of head.

Antennae approximated on vertex, especially in ♂, with scape short and thick, smoothly scaled; flagellum slender, fasciculate—ciliate in ♂, shortly pubescent in ♀. Palpus short, porrect, mostly slightly curved, median segment stout, broadest in middle, above with appressed scales in male, smooth in ♀, both with a short fringe of loosely projecting scales along lower edge and often on apex, terminal segment very short, obtuse, roughish (sometimes concealed). Thorax and legs smoothly scaled. Fore wing (Fig. 13) without costal fold in male, elongate-truncate, or rather narrowly elongate-ovate, apex varying from rounded-rectangular to deeply notched on vein 7,

termen from vertical to considerably oblique. All veins separate. 1b furcate, with furca from $\frac{1}{3}$ to $\frac{1}{2}$, longer in ♂, 2 from beyond middle to $\frac{2}{3}$, 3-7 slightly diverging (3-5 almost equidistant), 5 remote from 6, 6-9 slightly approximated at base, 7 to termen or to the notch, in that case termen strongly obtusely prominent between veins 6 and 5, forming a false apex, from there very oblique, 9-11 parallel, 10 about twice as far from 11 as from 9. Upper parting vein always developed in ♀, rarely partially obliterate in ♂, from half-way between 11 and 10 to between 9 and 8, or to 8, or to between 8 and 7, lower parting vein from base of radius to between veins 4 and 5, sometimes partially obsolete in ♂. Hind wing without cubital pecten, varying in shape from broadly semiovate to elongate-semiovate or rounded subtrapezoid. 1b shortly furcate, 2 from $\frac{2}{3}$ to $\frac{3}{4}$, 3 from angle, rarely connate, mostly closely approximated at base, seldom remote, 5 approximated at base, 6 and 7 closely approximated, rarely coincident towards base, parting vein from base to middle of angularly bent discoidal vein, sometimes weak.

KEY TO THE SPECIES OF *Cerace**Males*

1. Basal $\frac{2}{3}$ of both fore and hind wing bright yellow *sardias*
Not so 2
2. Termen in fore wing straight above 3
Termen in fore wing notched on vein 7, more or less prominent below notch 4
3. Ground colour of hind wing orange-yellow, smaller, Indian species . *tetraonis*
Ground colour of hind wing pale yellow, larger, Chinese species . *anthera*
4. Ground colour of hind wing white. *stipatana*
Ground colour of hind wing yellow or orange 5
5. Hind wing with cilia unicolourous yellow-orange; anal $\frac{1}{3}$ of hind wing densely covered with partially confluent black dots. *xanthocosma*
Hind wing with cilia at least more or less marked with black; anal $\frac{1}{3}$ of hind wing mostly with only a few or without markings 6
6. Ground colour of hind wing pale yellow. *onustana*
Ground colour of hind wing pale or bright orange 7
7. Hind wing with round, black preterminal dots between apical area and anal edge *cyanopyga*
Hind wing with a few irregular blotches between veins 1b-2, almost connected with apical black band, not reaching anal edge *xanthothrix*

Females

1. Basal $\frac{2}{3}$ of fore and hind wing bright yellow *sardias*
Not so 2
2. Fore wing yellow-orange, reticulate with ferruginous-violet *ios*
Not so 3
3. Termen in fore wing straight above or slightly concave 4
Termen in fore wing more or less distinctly notched on vein 7 5
4. Head and thorax ochreous white *loxodes*
Head and thorax black, the latter with yellow spots 5

5. Hind wing with a premarginal more or less continuous series of black blotches or with a black band posteriorly to costa before apex *tetraonis tetraonis*
Hind wing with 2-3 more or less isolated large round premarginal spots and sometimes a few small blotches *tetraonis archimedis*
6. Hind wing with ground colour throughout or only on basal half white 7
Hind wing with ground colour yellow or orange, without white 9
7. Hind wing with ground colour white throughout *stipatana*
Hind wing with ground colour white on basal half, suffused with yellow or fuscous posteriorly 8
8. Hind wing white on basal half, suffused with yellow posteriorly. Head, at least on vertex, black *myriopa*
Hind wing whitish with a fuscous blotch spotted dark fuscous on apical $\frac{1}{4}$ of wing. Head white *mesoclasta*
9. Base of hind wing without black markings *xanthothrix*
Base of hind wing with black markings 10
10. Hind wing with cilia yellow, only marked around apex with small black dots *xanthocosma*
Hind wing with cilia around apex black 11
11. Hind wing without black suffusion between markings except sometimes a cloudy suffusion on apical $\frac{1}{2}$ 12
Hind wing with brownish-black suffusion between markings from apex to anal angle *onustana*
12. Hind wing without any suffusion or with a small blackish suffusion in apex; anal area with small markings little connected with each other *guttana guttana*
Hind wing with distinct suffusion on apical $\frac{1}{2}$; anal area densely covered with large blotches mostly connected with each other *guttana obscura*

Cerace tetraonis Butler

Cerace tetraonis Butler, 1886, *Proc. Zool. Soc. Lond.*: 394, No. 177. Cotes & Swinhoe, 1885, *Cat. Moths India*: 699, No. 4773. Meyrick, 1912, in Wagner, *Lepid. Cat.* **10**: 15; 1913, in Wytzman, *Gen. Ins.* **149**: 20.

Cerace perdicina Moore, 1888, *Descr. Lepid. Atkinson*: 279. Cotes & Swinhoe, 1889, *Cat. Moths India*: 699, No. 4772. Meyrick, 1912, in Wagner, *Lepid. Cat.* **10**: 15; 1913, in Wytzman, *Gen. Ins.* **149**: 20. *Syn. nov.*

♂ 25-31 mm. Head black, a large rounded yellowish-white spot on face. Antenna black, tip of scape white above, flagellum faintly spotted with whitish above along basal half. Palpus black, basal segment and lower and apical edge of median yellowish-white, sometimes entire median segment mixed with whitish. Thorax black, with three pairs of erect, pale yellow spots; collar around head yellow, black in middle; tegula orange-red, with black edge, shoulder with a pale yellow patch. Abdomen black, posterior edge of segments orange-yellow dorsally, pale yellow laterally; ventrally pale yellow, harpe black with a yellowish spot before middle of costa. Legs black, femur and ventral half of tibia and apical ring pale yellow, tarsi with pale yellow apical rings. Fore wing with upper parting vein obliterate in middle, to between 8 and 9, lower parting vein vestigial; costa abruptly strongly arched at base,

little curved in middle, apical third straight, slightly oblique, apex shortly rounded, termen straight above, convex between veins 4-6, rounded beneath. Black, with a broad, dark, brick-red fascia from base to termen, parallel to costa, occupying second fourth of wing breadth, shortly continued up and down along termen, with a row of leaden-metallic round dots throughout and a few black dots before termen; markings pale yellow elsewhere: a row of transverse streaks on costa, a few dots above the red fascia and small dots arranged in more or less regular rows below it. Cilia black with violet gloss. Hind wing orange, sometimes turning yellow anteriorly, markings blackish: more or less confluent series of transverse short blotches on anal veins mostly remaining below cubital vein (only a few rounded spots sometimes above it), connected with a broad band gradually narrowed posteriorly, along termen to costa before apex, its edges somewhat serrate, leaving patches of ground colour on termen and in apex, its top abruptly narrowed on costa. Cilia anteriorly black, posteriorly orange with diffuse patches at ends of terminal veins.

Tegumen (Fig. 15) moderately broad. Uncus long, slender, bristled underneath almost half-way to base. Gnathos arms slender, hook rather broad, curved. Socii broad, little dilated, truncate, reaching to the point of gnathos. Valva elongate, slightly curved, costa evident, narrow, cucullus obliquely rounded, densely bristled, a patch of bristles on harpe slightly oblique, almost to base of valva. Saccus strong, narrow, densely bristled towards base, ending in a blunt short point. Transtilla rather broad, straight, scarcely narrowed in middle. Aedoeagus rather long, slender, sclerotized, strongly curved. Cornuti fine scobinations and short straight thorns. (Gen. No. 579 D., specimen examined labelled: India, Simla, 7,000 ft. A. E. Jones, in Brit. Mus. (Nat. Hist.))

♀ 33-39 mm. Yellow colour of head and thorax brighter. Yellow rings on abdomen broader. Fore wing with parting veins complete; narrower than in ♂, costa slightly convex beyond middle, termen with convex projection between veins 4-6 more distinct, otherwise exactly as in ♂. Hind wing with preterminal black band less compact and less broad than in ♂, its edges less regular.

7th ventrite (Fig. 23) little sclerotized, emarginate posteriorly, limen with a dilated plate in middle which is twice excavated on lower edge. Colliculum straight above, strongly sclerotized along lower $\frac{2}{3}$ with a round widening in middle. Ductus bursae narrow, bursa copulatrix spheroid, signum rather small, folded, densely dentate on inner surface. (Gen. No. 572 D.)

INDIA, N. INDIA, Khyra Gully; Assam, Khasias, Cherra Punji; Sikkim: Simla, Darjeeling; Punjab, Dharmasala, Murree Hills, Kulu District 2,600-7,000 ft. (*Maj. H. Roberts, Doncaster, A. E. Jones, Pilcher, Char. Maries, Hocking*) 1879, v.1895. *C. perdicina* is the male of *tetraonis*. Moore's description of *perdicina* (♂) is short and superficial. His description of hind wing, palpi, abdomen, and legs does not accord with the facts (type specimen in the British Museum (Nat. Hist.)).

***Cerace tetraonis archimedis* subsp. nov.**

♀ 35-36 mm. Head black, face with a large rounded yellowish-white spot, collar white at sides, yellowish with a black median patch above. Antenna black, faintly ringed with whitish, basal segment edged with white along inner side. Palpus black,

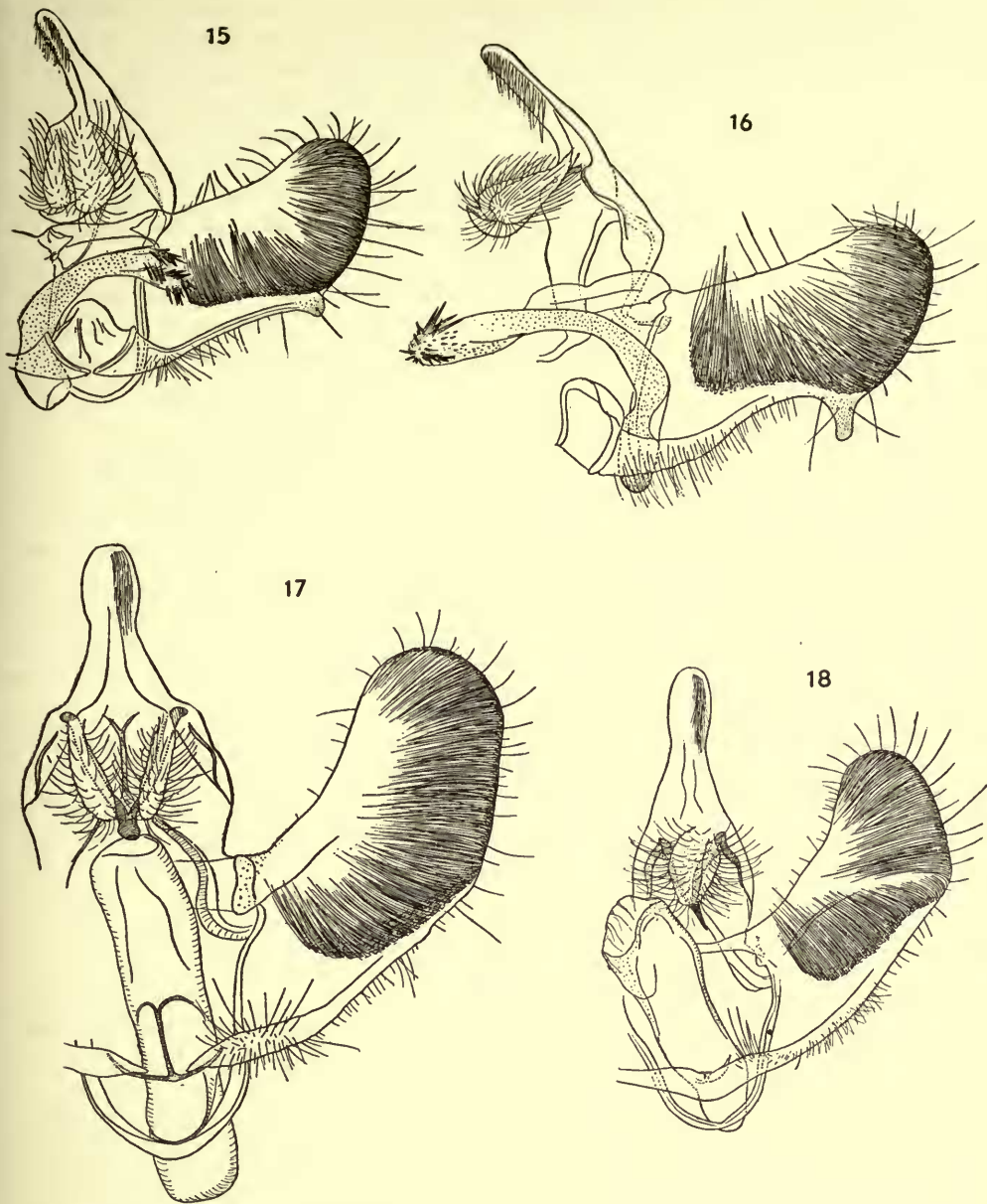
basal segment and ventral edge of median white. Thorax black, with yellow lateral spots, tegula with a broad longitudinal crimson band, whitish at extremities. Abdomen orange-yellow, dorsal bands along basal edges of segments, lateral row of dots and anal tuft brownish-black, or abdomen brownish-black, apical edges of segments orange-yellow; ventral side whitish. Legs black, femora white along ventral half; tibiae with white median and apical bands, tarsi white-ringed. Fore wing black, markings pale yellow; a series of oblique, irregular costal streaks, some of them furcate above or beneath or dilated in middle; dorsal area densely scattered with small dots which are more or less extended into very short streaks; a red longitudinal streak from base to termen along second fourth of wing, dilated along termen between veins 7-4, with two transverse rows of black dots and terminal edge shortly indent on veins; a series of round metallic dots rather irregularly scattered over red streak. Cilia black (damaged). Hind wing bright orange, anal $\frac{1}{3}$ with irregular small transverse black blotches between veins, sometimes more or less connected into zigzag lines; two or three large black marks before termen: first transverse irregular, sometimes connected with following, other two rounded. Cilia orange, with black dots on end of veins 2, 3, and 4 and minute black points on base of anal veins.

INDIA, Khasias, Cherra Punji, 1895 (*Doncaster*). Type in the Brit. Mus. (Nat. Hist.). Shillong, 5,000 ft., 26.ix.1927, Fletcher Coll. Burma, Bernardmyo, Ruby Mines 5,500-6,000 ft., vi.1890, Doherty (Walsingham Coll. No. 40985). 3 ♀. The genitalia are identical with those of the typical form.

***Cerace anthera* sp. nov.**

ἀνθηρός = multicoloured.

♂ 33 mm. Head black, face with a large rounded pale yellow spot; collar white at the sides, yellow with a median black spot above. Antenna blackish with faint white bands, basal segment with a pale yellow spot on inner side at apex. Palpus pale yellow, median and apical segments suffused with dark grey above. Thorax (damaged) with yellow spots: two lateral pairs, one spot on apex of mesothorax and a patch of long yellow hairs on each side of metathorax; tegula with an interrupted longitudinal yellow spot mixed with crimson scales. Abdomen black, ventral surface white, segments narrowly edged above with yellow posteriorly, anal segment black. Legs yellowish-white, black above, anterior tibia with median band, median tibia with median and apical bands, posterior tibia with apical band yellowish; tarsi with segments white-edged. Fore wing with upper parting vein ending between 9 and 8, lower parting vein indefinite; elongate-subovate, little dilated posteriorly (broadest at $\frac{2}{3}$); costa strongly gradually arched at base, less curved in middle, scarcely prominent at $\frac{4}{5}$, straight before apex, apex shortly rounded, termen straight above, slightly but distinctly prominent between veins 6-4, rounded, little oblique beneath; black, with purple gloss, markings pale yellow; costal area, somewhat broader than $\frac{1}{4}$ of wing, darker black, with a series of rather broad irregular transverse streaks, some of them furcate above or below, others with a few points beneath; dorsal area reaching a little over middle of wing, covered all over with numerous small dots of about the same size, arranged in irregular longitudinal rows, less numerous before termen; a



FIGS. 15-18. Male genitalia of *Cerace*: 15. *C. tetraonis* Butler. 16. *C. anthera* sp. n.
 17. *C. xanthocosma* sp. n. 18. *C. xanthothrix* sp. n.

longitudinal rather narrow dark red streak from base to termen along third seventh of disk, posteriorly with three suffused elongate black spots, brighter red and dilated into short projections to veins 7 and 4 along termen, indented posteriorly on veins; this red streak bears a row of round metallic dots throughout, a pair of suffused black spots posteriorly, and a round black dot before termen. Cilia black with purple gloss, glossy metallic-blue around apex. Hind wing very broad, ovate, rather pale yellow, tinged with orange towards apex; with veins 3 and 4 separate, 6 and 7 rather remote, markings greyish-black: a broad band along dorsum and termen, gradually narrowed posteriorly, its inner edge along lower edge of cell to angle forming a rounded projection there, thence half-way between cell and wing edge, parallel to this, to costa before apex; two rounded dots in cell, irregular short transverse yellow streaks and dots on anal veins and dorsal edge; apex with an erect-ovate orange-yellow patch. Cilia bright yellow, suffused with black on dorsum and on veins 2, 3, and 4; a short black basal streak between veins 4-6.

Tegumen (Fig. 16) broad, short. Uncus long, strong, bristled over the half of its ventral surface. Gnathos rather short, with arms gradually considerably dilated towards apex, hook short. Socii elongate-truncate, dilated towards top, reaching to hook of gnathos. Valva elongate, narrowed in middle, costa evident, rather broad, cucullus obliquely rounded, densely bristled, bristles on harpe obliquely to $\frac{1}{2}$ of disk. Saccus narrow, densely bristled towards base, with a long blunt hook posteriorly. Transtilla straight, slightly indented in middle of upper edge. Aedoeagus long, slender, curved, with base slightly dilated. Cornuti straight thorns of different sizes. (Gen. No. 580 D., type.)

CHINA, Siao-Lou, 1901 (*Chasseurs indigènes du P. Dejean*). Type in the British Museum (Nat. Hist.). Unique. This species is closely allied to the preceding and can be distinguished with certainty only by the study of the genitalia. Further differences are: yellow tegulae instead of red, both fore and hind wing broader, red streak in fore wing much smaller, ground colour of hind wing and of under side rather pale yellow instead of orange.

Cerace loxodes Meyrick

Cerace loxodes Meyrick, 1912, *Exot. Microlepid.*: 1, 19 (♀); 1912, in Wagner, *Lepid. Cat.* 10: 15, 1913; in Wytzman, *Gen. Ins.* 149: 20.

The author did not study this species. The original description is as follows:

♀. 52 mm. Head and thorax ochreous-white (partly defaced). Abdomen orange. Fore wings elongate, rather narrow, costa strongly arched, apex obtuse, termen straight, rather strongly oblique; dark coppery-purple-fuscous: submedian fold from base to middle and a streak of suffusion from $\frac{1}{3}$ of disc to apical blotch orange-red; very numerous ochreous-white dots and small round spots arranged in longitudinal rows, on costa becoming transverse bars, longer towards base, on red streak posteriorly marked with silvery scales; an orange-red apical blotch, triangularly produced along upper half of termen: cilia whitish, barred with dark fuscous and at apex with reddish. Hind wings orange; a dark purple-fuscous blotch occupying apical $\frac{2}{3}$, anterior edge somewhat broken into spots, especially towards dorsum; cilia orange, on apical blotch dark fuscous, with white spots at and above apex.

'Tenasserim; one specimen.'

The type of this species is neither in the general collection of the British Museum (Nat. Hist.) nor in the Meyrick collection. Perhaps it is in the Indian Museum at Calcutta. According to the typical shape of the fore-wing this species is possibly allied to *tetraonis*.

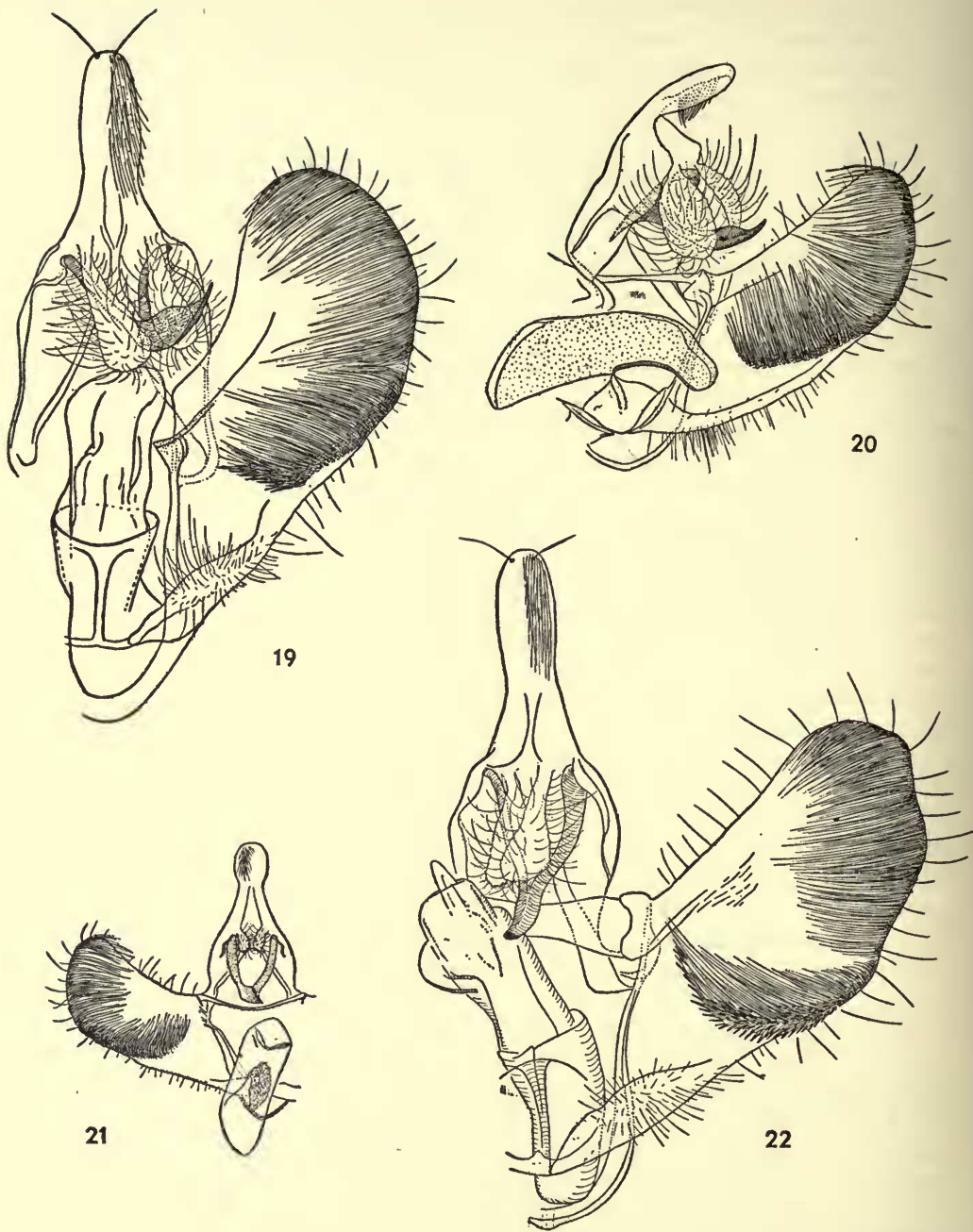
***Cerace xanthocosma* sp. nov.**

ξανθός = yellow, *κόσμος* = an ornament

? *Cerace guttana* Esaki (*nec* Felder), 1932, *Nippon Konchu Zukan*: 1449, No. 2867, f. ♀, pl. 2, fig. [1].

♂ 33-40 mm. Head white, tuft around and between the base of antennae black. Antenna blackish, from above with faint light grey bands. Palpus short, rather broad, black, basal segment and lower and apical edge of median segment white. Thorax purplish-black, markings white: an anterior and an antemedian pair of narrow short lateral longitudinal streaks, a narrow streak on each tegula, apex of mesothorax white. Metathorax dark brown with a pair of yellowish-grey tufts of long hairs at the sides. Abdomen yellow, dorsal halves of segments with black bands along posterior part, broadest in middle, narrowed before extremities, increasing in breadth posteriorly, 1st, 7th, and 8th tergites entirely black, the last mentioned with black fringe mixed with yellow; ventral surface pale yellow, valva brownish-black with purple gloss. Legs whitish-yellowish, median and posterior tibia brighter yellow, knees dark brown; tarsi dark brown, posterior half of basal segment and apical rings of these segments yellow. Fore wing with vein 1b furcate to a little before $\frac{1}{2}$, upper parting vein complete, to between veins 8 and 9, lower parting vein present. Elongate, little dilated, broadest at $\frac{2}{3}$. Costa abruptly strongly arched at base, distinctly concave in middle, rounded-prominent at $\frac{2}{3}$, straight posteriorly, apex rounded, termen vertical above, indented on vein 7, prominent between veins 7-4, straight and oblique beneath. Black, tinged purple; a narrow, dark crimson, suffused streak from base to terminal patch, widened in cell, not broader there than about $\frac{1}{4}$ of wing breadth, narrowed at extremities, with a narrow branch along basal $\frac{2}{3}$ of fold; terminal patch orange, yellow below, narrow, its edges scobinate. White markings fine: costal streaks very narrow, dots all of the same size, minute, in regular rows between veins; some minute leaden-metallic scales on crimson streak and on tornal patch. Cilia black with yellow patches on end of veins. Hind wing broadly semiovate, veins 3 and 4 connate, veins 6 and 7 very closely approximated towards base, yellow-orange, markings black, anal half densely covered with large rounded blotches and dots reaching lower edge of cell, connected with each other and arranged in diverging rows parallel to anal veins, apical $\frac{1}{4}$ - $\frac{1}{5}$ evenly suffused with smaller black dots, this suffusion connected with anal markings and sometimes partially obscuring them posteriorly. Cilia bright orange-yellow, shining.

Tegumen (Fig. 17) strong, broad. Uncus robust, with broad base and dilated top with two large patches of bristles underneath. Gnathos rather long with slender arms and a strong hook. Socii elongate, almost as long as gnathos. Valva elongate, rather narrow, gradually curved, with costa indicated, broad, cucullus evenly



FIGS. 19-22. Male genitalia of *Cerace*: 19. *Cerace onustana* Moore. 20. *C. stipatana* Walker.
 21. *Bathypluta triphaenella* Snellen. 22. *C. cyanopyga* n. sp.

rounded, densely bristled, bristles continued into an oblique dense patch on harpe not reaching to $\frac{1}{4}$ of disk. Saccus rather weak, narrow, bristled along edge and towards base over entire surface. Transtilla membranous, straight. Aedeagus short, stout, tubular, slightly curved, with oblique orifice. Cornuti not perceptible. (Gen. No. 585 D., type.)

♀ 48–59 mm. Head, antenna, and palpus as in ♂, white edge of median segment of palpus broader. Thorax paler, white spots much broader, anterior ovate, median triangular. Abdomen: orange-yellow, dorsal bands along apical half of segments brownish-black, scarcely interrupted by ground colour laterally to form a row of subquadrate brownish-black lateral dots; ventral surface pale yellow. Legs as in male. Fore wing with 1c furcate to a little before $\frac{1}{2}$, parting veins distinct, upper to between veins 8 and 9. Shape varying considerably, broader or narrower, costa abruptly strongly arched at base, almost straight in middle, gently curved at $\frac{4}{5}$, straight posteriorly, apex little rounded, termen vertical above, notched on vein 7, prominent between veins 7–5, little curved, oblique beneath. Rather faded purple-blackish, black along costa and often along base; a pale fuscous-reddish discal suffusion from base to ternal patch in middle not broader than $\frac{1}{4}$ of wing, interrupted by rows of white dots and divided by them into 2–3 narrow streaks broader only in cell with a branch along basal $\frac{1}{2}$ of fold, only one of which reaches terminal patch; the latter narrow, especially below, bright orange between 7–6, bright yellow elsewhere, reaching along termen to vein 1c, its edges scobinate, its lower end zigzag; white marking conspicuous, costal fasciae broad and close to each other, dots large, round, of different sizes, arranged regularly, also over discal red suffusion, a few leaden-metallic scales edging white dots above and below on red suffusion and on terminal patch. Cilia black with yellow streaks on veins. Hind wing elongate-ovate, veins as in ♂. Rather dull light yellowish-orange, mostly tinged ochreous, markings dull greyish-black: irregular rounded blotches and dots more or less connected with each other in diverging rows between anal veins below cell, less regular and fewer between terminal veins in apex and along costa; a distinct narrow streak along parting vein, rarely dissolved into a series of dots. Cilia orange-yellow, shining, black dot on end of vein 8 and vein 7, on other veins only faintly suffused with greyish.

7th abdominal segment (Fig. 24) strongly sclerotized, ventrite with a deep emargination in middle. Limen sinuate in middle, with small thickenings at the sides of lower edge. Ostium a broad, strongly sclerotized cup, its narrowed lower part curved to the left and membranous at that side. Ductus bursae long, coiled above. Bursa copulatrix almost spheroid, large. Signum a concave plate with large dentations. (Gen. No. 573 D.)

JAPAN, Prov. Yamato, Honshu, 984 ft., 20.x.1900. Nawa Gifu; Komiawa; Kobe, 13.ix.1909; Shimo-Shiiba, Prov. Hyuga, Kyushu 12–13.vii.1893. (Pryer, Allotype, in the British Museum (Nat. Hist.), J. E. A. Lewis, A. E. Wileman.) 10 ♂, 14 ♀. A distinct species closely allied to *guttana*. Unfortunately the male of the latter is not known yet. The female genitalia of the present species and of *guttana* show very little difference, but this may be no objection for the separation of the present species. A long series of both species permits easy separation of the females. The differences may be summed up as follows:

guttana ♀

1. Cilia of hind wing black around apex (from vein 8 or 7 to vein 5).
2. Ground colour of hind wing bright golden-yellow.
3. Markings of hind wing velvety jet-black.

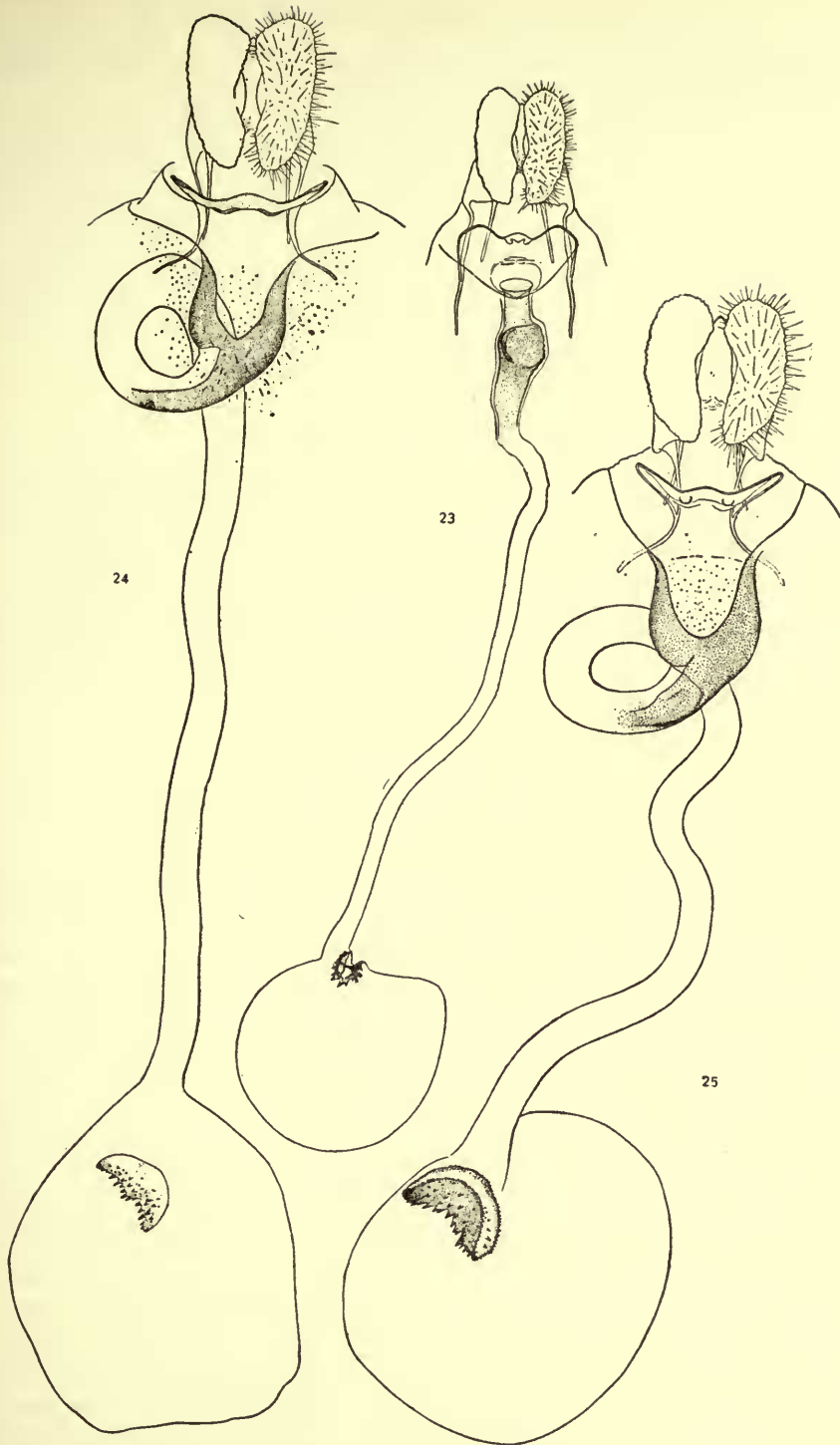
xanthocosma ♀

1. Bright yellow, with only a few very small dots around apex (on veins 8 and 7).
2. Rather dull light yellowish-orange, mostly tinged ochreous.
3. Dull greyish-black.

***Cerace guttana* Felder**

Cerace guttana Felder, 1875, *Reise 'Novara' Lepid.* 2: pl. 139, fig. 51 (♀). Cotes & Swinhoe, 1889, *Cat. Moths. India*, 699, No. 4769. Walsingham, 1900, in Swinhoe, *Cat. Heter. Mus. Oxon.*: 2: 565. Meyrick, 1912, in Wagner, *Lepid. Cat.* 10: 15; 1913, in Wytzman, *Gen. Ins.* 149: 20. Diakonoff, 1932, *Zoöl. Meded.* 21: 130-132 (erroneously regarded as conspecific with *onustana* Walker); 1941, *Treubia* 18: 29.

♀ 53-60 mm. (One specimen 42 mm.—obviously a starveling.) Head white, tuft on vertex and around base of antennae black; collar white, black above, except a white spot in middle. Antenna dark brownish-grey, from above light grey, with black bands, basal segment dark brown. Palpus black, basal segment and lower and apical edge of median white. Thorax purplish-black, anterior white spots large, oval, median triangular, fifth white patch on apex of mesothorax; metathorax dark brown, lateral brushes yellow; lateral half of patagium white, tegulae with an oblique broad white band. Abdomen bright yellow, each segment posteriorly with a broad transverse bluish-black band, gradually narrowed towards extremities; a row of elongate lateral bluish-black spots, anal tuft bright yellow. Legs yellow, basal bands of tibiae and tarsi except apical half of basal segment of median and posterior leg dark brown. Fore wing with 1c furcate to beyond middle, parting veins present, upper to between veins 8 and 9. Narrowly elongate and broadest at $\frac{3}{4}$: costa abruptly strongly arched at base, faintly prominent before $\frac{1}{5}$, somewhat concave before middle, distinctly prominent at $\frac{3}{4}$, faintly curved and oblique posteriorly, apex rounded, termen almost vertical above, strongly prominent between veins 7-4, straight and oblique beneath. Costa to cell and dorsum to fold bluish-black, disk elsewhere suffused with dark ferruginous-crimson, this area elongate-rhomboidal, broadest beyond middle of wing; terminal blotch elongate, narrow, to vein 1c, little narrowed beneath, yellow, tinged orange only between veins 7-6, with a pair of black dots above, white markings large and coarse: costal fasciae robust, round dots of different sizes, each horizontal row containing dots of almost the same size; a few leaden-metallic shining scales forming upper and lower edge of white dots in crimson suffusion and on terminal patch. Cilia black, yellow with round black dots around tornal patch. Hind wing with veins 3 and 4 mostly connate, seldom separate, veins 6 and 7 mostly shortly stalked, seldom connate, in one specimen separate and approximated towards base; ovate-subtrapezoid; brightly golden-yellow, glossy, dark markings velvety jet-black; except in cell and a little beyond it the wing is covered with irregular rounded dots and blotches, sometimes connected with each other to form irregular bands perpendicular to veins, these markings longer and coarse on terminal area, finer, sometimes forming zigzag lines on anal area between veins; parting vein sometimes with a row of small dots on basal part; seldom a small dark brown suffusion in



FIGS. 23-25. Female genitalia of *Cerace*: 23. *C. tetraonis* Butler. 24. *C. xanthocosma* sp. n.
25. *C. guttana* Felder.

apex. Cilia yellow, black between veins from 8 or 7 to 5, with black basal line continued as far as vein 4 or 3, black dots on veins.

7th segment (Fig. 25) strongly sclerotized, ventrite deeply emarginate. Limen rather broad, curved, with a knob on each side. Ostium strong, broadly cup-shaped above, narrowed beneath and turned to the left, at that side emarginate and membranous. Ductus bursae coiled, long. Bursa subspheroid. Signum a large, folded plate with rows of strong dentations on inner surface. (Gen. No. 574 D.)

INDIA, Assam, Cherra Punji; Dibrugarh. Sikkim. viii-xi.1888, 1894, 1895. (*Doncaster, Möller, E. F. Badgley.*) 11 ♀. Also recorded from Sylhet, Shillong (and Darjeeling in Sikkim). Type, in the British Museum (Nat. Hist.).

Cerace guttana obscura subsp. nov.

♀. Hind wing with markings more numerous, larger, more densely arranged, forming more or less continuous transverse black bands all over veins; cell with small, more or less continuous markings, reaching to costa; faint blackish suffusion between markings, especially before apex and upper part of termen.

INDIA, Bengal (Type); Darjeeling (*A. Desgodins, Russell*). ISHIGAKI SIMA ISLAND, between Riu Kiu and Formosa, Yayeyama, ix-x.1896. 3 ♀ all in the British Museum (Nat. Hist.). The specimen from Ishigaki Island has the apex of hind wing considerably suffused with blackish-grey.

Cerace myriopa Meyrick

Cerace myriopa Meyrick, 1922, *Exot. Microlepid.* 2: 497-498 (♀). Caradja, 1925, *Anal. Acad. Române* (3) 3: 375.

♀ 56 mm. Head white, tuft on vertex except base and edge of eyes purple-black. Antenna blackish, faintly ringed with whitish above (damaged). Palpus white, median segment except lower and apical edge purple-black, apical segment black. Abdomen yellowish white anteriorly, turning bright yellow towards apex, anal tuft yellow; dark brown transverse dorsal bands on posterior halves of segments; a row of lateral longitudinal streaks; ventral surface pale yellow posteriorly, whitish anteriorly. Legs pale yellow, anterior femur purple-black above, tibiae with purple-black apical bands, tarsi purple-black, apical half of basal segment and apical rings on other segments yellow. Fore wing with upper parting vein from half-way between 11 and 10 to base of 8. Very narrowly elongate, little dilated, broadest at $\frac{1}{6}$, costa abruptly strongly arched at base, straight beyond this, gently curved and prominent from beyond $\frac{1}{2}$ to beyond $\frac{4}{6}$, concave before apex, rounded but considerably prominent, as the termen is deeply notched on vein 7, strongly rounded-prominent below this, faintly concave, extremely oblique beneath. Blackish-purple, suffused with black along costa; markings white: numerous dense irregular oblique rather narrow costal streaks, some of them interrupted, others furcate or not reaching costal edge; numerous horizontal series of white dots, more or less confluent into almost continuous white streaks posteriorly; brick-red discal suffusion forming a streak in fold from before base to $\frac{1}{2}$, a broader streak in disk above middle from before base to

before termen, very narrow posteriorly and a third narrow streak from middle of disk to terminal blotch along upper edge of cell and vein 6; white markings on crimson suffusion edged above and beneath with violet-leaden shining scales; terminal blotch elongate, crimson, orange posteriorly, between veins 6 and 5 orange-yellow, below becoming interrupted into round pale yellow dots, which reach termen. Cilia black, with orange spots on veins 6-5, yellow spots on veins 4-2 and in tornus. Hind wing whitish, apical half suffused with pale yellow, brighter posteriorly; irregular greyish-brown transverse blotches, becoming black towards apex, scattered along termen and over anal area below cell, a row of round dots along costa and basal half of parting vein; a pair of small dots between cell and termen, a series of such dots on apical and upper part of terminal edge of wing. Cilia yellow, paler on dorsum.

7th ventrite (Fig. 27) strongly sclerotized, with a narrow deep emargination posteriorly. Limen moderately broad, strongly curved, without knobs. Ostium a rather narrow deep cup, narrowed and turned to the left below, partially membranous at that side. Ductus bursae coiled, rather long. Bursa copulatrix a folded dentate plate. (Gen. No. 575 D.)

CHINA, Ichang, Chang-Yang, 4,000-6,000 ft., 1886 (*Pratt*). 1 specimen. Closely allied to *guttana* but immediately separable by whitish basal half of hind wing. Type specimen from Tse-Chuan (Szechuen) in the Muséum National d'Histoire Naturelle at Paris.

***Cerace mesoclasta* Meyrick**

Cerace mesoclasta Meyrick, 1908, *Rec. Indian Mus.* 2: 395 (♀); 1912, in Wagner, *Lepid. Cat.* 10: 15; 1913, in Wytzman, *Gen. Ins.* 149: 20.

The author did not study this species. The original description is as follows:

'♀. 41 mm. Head white, collar purple-blackish edged with white. Palpi white, with a grey streak along upper edge of second joint except at apex, terminal joint grey. Antennae dark grey ringed with white. Thorax dark purple-fuscous, with five white spots, patagia edged with white. Abdomen blackish, segmental margins light ochreous-yellow, apex orange. Fore wings elongate, narrow, rather dilated posteriorly, costa gently arched, apex very obtuse, termen rounded so as to project rather beyond apex; dark purple-fuscous, covered with rows of numerous small whitish spots between veins, towards costa united into transverse strigae which become larger towards base; in the middle of disc these spots coalesce into a longitudinal streak; an elongate orange spot on termen, extending from vein 2 to 6; cilia dark fuscous (imperfect). Hind wings whitish; a fuscous blotch suffusedly spotted with dark fuscous occupying apical fourth of wing; a row of dark fuscous spots along costa; about three rows of dark fuscous spots extending over dorsal area of wing from base to apical blotch, smaller towards base; cilia white, round apical blotch mostly dark fuscous.

'Kurseong, E. Himalayas, at 5,000 ft., in May; one specimen. Nearest *C. stipatana*, but easily known by the discal white streak, less extensive orange patch, spotted dorsal area of hind wings, and blackish-banded abdomen. In the specimens described veins 6 and 7 are short-stalked in one fore wing by an abnormality, the other wing being quite normal.'

According to the colouring of the hind wing the present species may be allied to *myriopa*. The type is not in the British Museum (Nat. Hist.). Probably it is in the Indian Museum at Calcutta.

Cerace onustana Walker

Cerace onustana Walker, 1863, *List Lepid. Brit. Mus.* **28**: 423. Moore, 1867, *Proc. Zool. Soc. Lond.*: 668. Cotes & Swinhoe, 1889, *Cat. Moths India*: 699, No. 4770. Meyrick, 1912, in Wagner, *Lepid. Cat.* **10**: 15; 1913, in Wytzman, *Gen. Ins.* **149**: 20. Wisherd & Murrayama, 1929, *Nat. Geogr. Mag.* **56**: 73, pl. 16, fig. 6. Matsumura, 1931, *6000 Illustr. Ins. Japan*: 1067, fig. 2127 (♀). Diakonoff, 1941, *Treubia*, **18**: 30, pl. 3, fig. 3 (genit. ♂).
Cerace guttana, Diakonoff (*nec* Felder), 1939 (*ex errore*), *Zoöl. Meded.* **21**: 132.

♂ 39 mm. Head white, tuft on vertex and edge of eyes above black; collar white, black above, except in middle. Antenna black, shaft white above except on base of segments. Palpus black, basal joint and apex of median white, lower edge of median mixed with whitish scales. Thorax purplish-black, somewhat mixed with white scales (damaged), two pairs of lateral white spots, a white spot on apex of mesothorax; metathorax blackish with a yellow pencil of long hairs on each side. Abdomen orange-yellow, light yellow on ventral surface, 1st tergite black, other tergites with an ovate large black spot in middle, spots increasing in size towards apex; anal tuft black, a row of lateral spots and 8th segment with a pair of subapical latero-ventral spots. Legs yellow, knees and base of tibiae black, tarsi black, anterior basal segment with an apical yellow ring, median and posterior basal segments with apical half yellow. Fore wing with vein 1b furcate along its basal half, upper parting vein to between veins 7 and 8, lower parting vein weak. Narrowly elongate, little dilated, broadest at $\frac{4}{5}$; costa curved at base, straight in middle, slightly projecting at $\frac{4}{5}$, faintly concave before apex, apex rounded, termen vertical above, strongly obliquely projecting between veins 7-5, oblique and straight beneath. Purplish-black, turning jet-black posteriorly; central part of disk narrower than $\frac{1}{3}$ of wing breadth with a dark ferruginous-crimson suffusion narrowed beyond middle of wing, scarcely reaching terminal spot, with a short branch in fold from cell half-way towards wing edge and a shorter indistinct branch along base of vein 12; terminal spot small, orange, paler below, narrowed there and almost dissolved into a series of blotches; markings white: costal streaks narrow, remote from each other, dots almost of the same size, in regular horizontal rows; some dots before middle of termen on and before terminal spot covered with shining violet-metallic scales. Cilia black mixed with white scales (damaged). Hind wing elongate-ovate, with veins 3 and 4 connate, 6 and 7 connate. Bright yellow, marginal half with sparse irregular jet-black dots and marks in two rows: larger posteriorly, smaller anteriorly; apical $\frac{1}{2}$ of wing with brownish-black suffusion, almost entirely obscuring black marks there, its anterior edge concave, little suffused, to tip of vein 1c. Cilia black along dark suffusion, yellow elsewhere.

Tegumen (Fig. 19) strong, erect. Uncus rather long with two long bristles at the top, haired underneath. Gnathos long, its hook dilated. Socii elongate, as long as gnathos. Valva elongate, dilated posteriorly; costa indicated, cucullus obliquely rounded, with dense bristles, harpe densely bristled following the edge of valva. Sacculus narrow, bristled towards base. Aedoeagus rather long, stout, tubular and straight. Cornuti not perceptible. (Gen. No. 584 D.)

INDIA, Assam, Khasias, x.1894. The type is from Nepal. 4 ♂.

♀ 50-60 mm. Head white, tufts around and between base of antennae black; collar white with two dorsal black patches. Antenna blackish-brown, light grey,

ringed black above. Palpus black, basal segment and lower and apical edge of median with a rather broad white edge. Thorax purplish-black with blue sheen, lateral half of patagium, a streak on tegula, large ovate anterior, triangular median and apical spots white; mesothorax dark brown with yellow tufts. Abdomen bright yellow, each segment with a broad posterior transverse blackish-purple band, narrowed laterally and a narrowly-elongate lateral patch; anal tuft bright yellow. Legs yellow, tibiae with basal bands and tarsi, except the anterior, with apical half of basal segments dark brown. Fore wing with 1c furcate to beyond middle, parting veins present, upper to between veins 8 and 9. Narrowly-elongate, costa considerably but not abruptly curved at base, almost straight before middle, prominently gradually rounded at $\frac{3}{4}$, slightly concave beyond, apex rounded, termen vertical above, notched on vein 7, strongly prominent between veins 7-4, straight, very oblique beneath. Purplish-black along costa to cell, along dorsum to fold and posteriorly to vein 4; disk elsewhere suffused with dark ferruginous-crimson, forming 3 narrow streaks between rows of white dots and another one in basal half of fold; terminal patch narrow, forming a streak to 1c, rather pale yellow, tinged orange between veins 6-7; a few metallic scales in crimson suffusion and in terminal patch. Cilia black, white streaks on veins. Hind wing elongate-subtrapezoid, rather narrow, yellow, markings purplish-black: irregular dots and blotches all over the wing arranged in garlands transversely to veins, broader posteriorly, abruptly narrowed on cell and costa; a dark purplish-brown suffusion from costa to anal angle extended over about $\frac{2}{3}$ of wing breadth. Cilia dark grey, blackish with a black basal line around apex, yellow along anal edge.

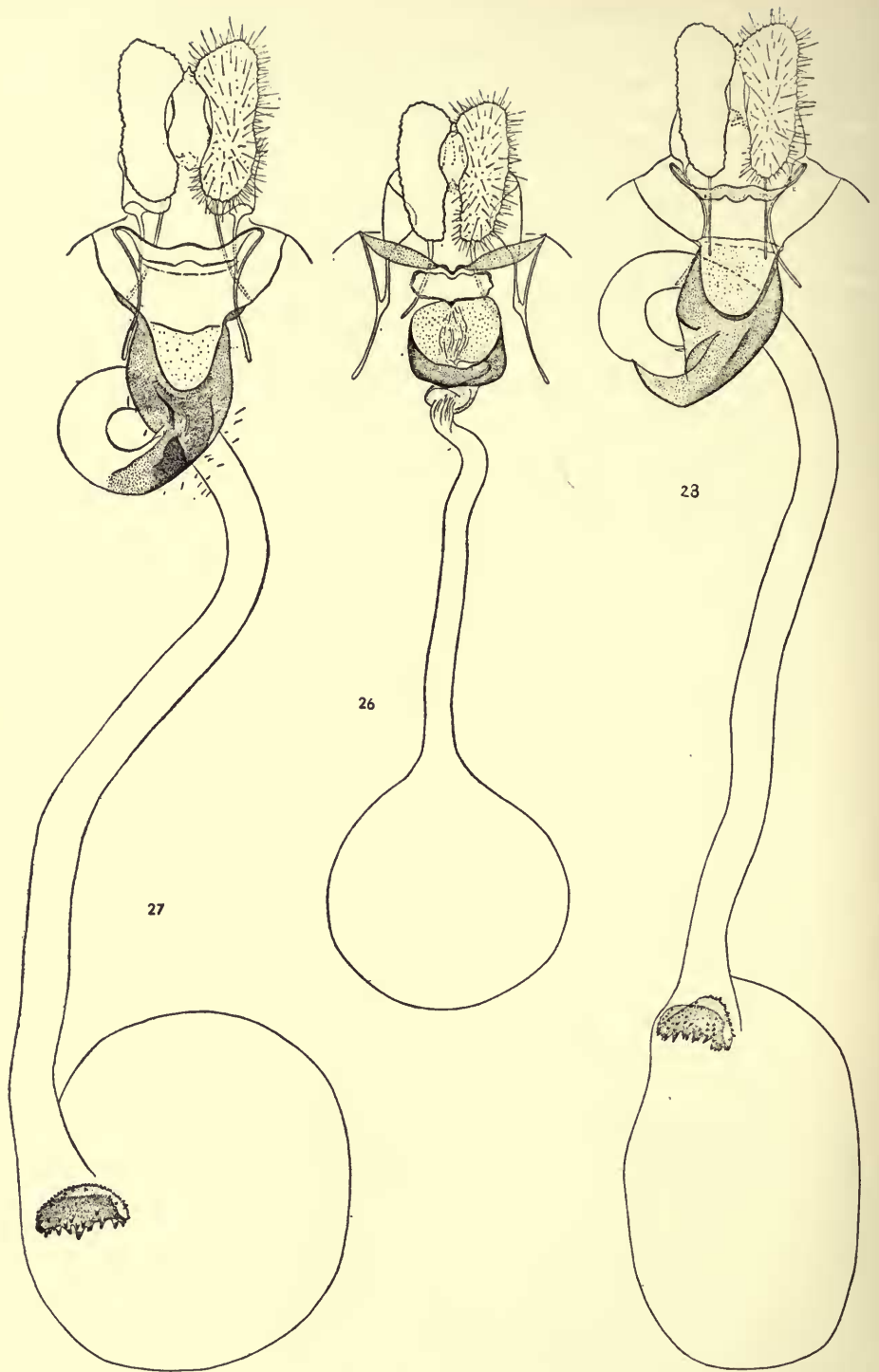
7th ventrite (Fig. 26) little sclerotized. Limen broad at the sides, narrowed in middle, folded in the shape of a V. Ostium a strong broad and shallow cup, abruptly narrowed into a short tube. Ductus bursae narrow, rather short, with finely scobinate wall. Signum absent. (Gen. No. 607 D.)

INDIA, Sikkim: Darjeeling; Bengal (*R. P. Bretaudeau*, 1884). 3 specimens. Also recorded from Japan (*Wisherd & Murrayama*, 1929; *Matsumura*, 1931), but possibly these records refer to *xanthocosma*. The ♀ genitalia of this species differ considerably from those of *guttana*. Type in the British Museum (Nat. Hist.).

Cerace cyanopyga sp. nov.

κράνεις = dark blue, πυγή = rump

♂ 44 mm. Head white, tuft of long hair-scales around base of each antenna black. Antenna dark brown, flagellum with broad white bands on upper side, cilia whitish. Palpus black, basal segment throughout, and median segment along under side, except in middle and around apex white. Collar of scales around head white. Thorax black with two pairs of white erect spots at the sides and one on apex; patagium white, tip black, tegula black with an oblique white fascia; metathorax with a large yellow spot on each side. Abdomen orange, 1st segment suffused with blackish, other segments each with a bluish-black dorsal band along posterior edge and a lateral dot. Valva bluish-black, cilia dark grey mixed with white. Legs orange, base of tibiae, basal half of 1st tarsal segments and other tarsal segments bluish-black. Fore wing



FIGS. 26-28. Female genitalia of *Cerace*: 26. *C. onustana* Moore. 27. *C. myriopa* Meyrick. 28. *C. xanthothrix* sp. n.

elongate, rather narrow, broadest at $\frac{3}{4}$, both parting veins developed, upper to base of vein 8. Costa strongly curved at base almost straight along middle half, bluntly projecting at $\frac{3}{4}$, from there straight and oblique to apex, apex subacute, projecting between veins 7 and 8, termen deeply notched on vein 7, rounded and considerably projecting between vein 7 to 4, very oblique below. Black, middle third of wing crimson-ferruginous from base to before termen, somewhat narrowed there. Markings white: somewhat curved oblique streaks on costa, reaching about $\frac{1}{3}$ across wing, numerous rounded dots arranged in longitudinal rows scattered all over the wing except on costa, on narrow distal part of ferruginous suffusion and before termen; a large dark orange preterminal patch connected with above-mentioned suffusion reaching downward along termen to vein 2, its edges serrate; several round violet-metallic shining dots in middle of disk before termen and a few shining scales partially edging several white dots in disk. Cilia bluish-black, with about 5 whitish patches along termen below vein 7. Hind wing elongate—semiovate, rather narrow towards apex, veins 3 and 4 connate. Bright orange, markings black: an erect semiovate rather large apical patch; round spots of different sizes from this to tornus arranged in two rows. Cilia orange, black around apex.

Tegumen (Fig. 22) moderately broad. Uncus strong, its top erect-ovate, with two long patches of bristles underneath. Gnathos moderate, with slender arms and a long slender curved hook. Socii narrow, elongate, not reaching hook of gnathos. Valva elongate, rather broad, costa evident, cucullus rounded above, very oblique beneath gradually densely fine-bristled, with harpe obliquely rounded, very densely covered with strong bristles. Saccus with broad, flattened, long-bristled base, indefinite posteriorly. Transtilla broad, membraneous, straight, somewhat narrowed in middle. Aedeagus broad, stout, tubular, slightly curved, with dilated and obliquely truncate apex. (Gen. No. 583 D., type.)

BURMA, Maymyo, 11.v.1901 (*H. J. W. Barrow*). 1 specimen, type, in the British Museum (Nat. Hist.). Nearest to the following.

Cerace ios Diakonoff

Cerace ios Diakonoff, 1939 *Treubia* 18: 30, pl. 1, fig. 1.

♀ 45.5 mm. Head yellow. Antenna black, yellowish ringed. Palpus black, with basal segment and the base of terminal yellow. Thorax yellow, a round ferruginous dot on tegula and in middle of anterior edge. Abdomen yellow. Legs yellow with black articulations; anterior and median tarsi black yellow-ringed, posterior tarsus with base of basal segment black. Fore wing with costa strongly but regularly arched as far as $\frac{1}{3}$, straight posteriorly, gradually curved beyond middle, slightly convex before apex, apex bluntly prominent, termen concave beneath apex, then prominently rounded in cells 7-5, oblique beneath. Yellow-orange, reticulate with ferruginous-violet: on basal half of wing ground colour predominates, yellow blotches being larger than ferruginous bands and stripes; on terminal half of wing and along dorsum yellow colour reduced to round spots, and dark markings predominate; dark markings black along costa and dorsum; a row of transverse strigae on costa, reaching to $\frac{1}{3}$ of wing breadth at base, gradually decreasing in length, but increasing in breadth

towards apex; a round yellow dot before apex; elsewhere the wing scattered with round yellow blotches, arranged in horizontal rows and decreasing in size posteriorly; termen red in cells 7-3. Cilia red with some 6 black semicircular dots. Hind wing bright yellow-orange, paler at base, terminal $\frac{1}{3}$ black, anterior edge of this black area somewhat diffuse, sinuate; black rounded dots on lower half of wing, decreasing in size towards termen. Cilia yellow, black around terminal $\frac{1}{3}$ of wing.

NORTH-EAST BORNEO, Mt. Kina Balu. Unique. Type in Universitätsmuseum, Berlin (ex Coll. Staudinger.) The specimen could not be obtained for the present study. In the original description the word 'patagium' must be changed into 'tegula' (lapsus).

***Cerace xanthothrix* sp. nov.**

$\xi\alpha\nu\theta\acute{o}\theta\rho\iota\xi$ = golden-yellow haired

δ 33-38 mm., f 48 mm. Head white, face edged black, in f slightly suffused with ochreous, tufts between antennae black, white at base. Antenna (damaged) blackish, white-ringed. Palpus black, basal segment and lower and apical edge of median segment white. Thorax ferruginous-blackish with two pairs of lateral spots and apex white, metathorax with a pair of lateral spots white in δ , yellow in f , tegula with an oblique white fascia. Abdomen yellow or orange-yellow, brighter posteriorly, pale yellow beneath, anal tuft in f yellow-orange, δ with a blackish-grey or bluish-black spot on 8th tergite, valva brownish-black with a violet sheen, edged with yellow beneath. Legs: anterior whitish, tibia suffused with black along upper half, median tinged with ochreous, posterior ochreous-yellowish: knees dark brown, tarsal segments with dark brown base. Fore wing with both parting veins developed, upper to between base of 8 and 9; elongate-ovate, much broader in f (δ 3.2 \times , f 2.7 \times as long as broad). Costa abruptly strongly arched at base, in middle slightly concave in δ , straight in f , at $\frac{1}{2}$ bluntly angulate in δ (less distinct in f), straight and oblique before apex, apex shortly rounded, termen notched on vein 7, considerably obtusely projecting between veins 5 and 6, very oblique beneath. Blackish-violet, suffused with black along costal $\frac{1}{3}$; a narrow streak of brick-red suffusion just above middle of disk from base to termen, another such streak along basal $\frac{2}{3}$ of fold; terminal patch bright orange, paler below, with four small semiovate dots on termen; other markings white: costal streaks somewhat sinuate, on posterior half of wing irregular, dissolved in dots; rows of dots all over the wing, rather large and coarse, irregular; violet-metallic scales in red discal suffusion edging white dots from below; a few black dots on preterminal area. Cilia black, blotched black and white with orange base around terminal patch. Hind wing with 3 and 4 almost connate in δ , separate in f , broadly subtrapezoid. Bright orange in f , paler in δ ; posterior $\frac{2}{3}$ of wing brownish-black with violet gloss and faint yellowish spots: with anterior edge concave, serrate above, more or less dissolved in a few irregular transverse blotches and dots between veins 3 and 1b, on terminal edge reaching not far beyond vein 2. Cilia with alternating white and black patches around black area, a narrow basal line black; yellow or orange elsewhere.

Tegumen (Fig. 18) moderately broad, rather high. Uncus strong, with elongate-ovate top, two patches of bristles underneath. Gnathos with moderately broad arms

and a strong dilated hook. Socii broad, reaching to $\frac{2}{3}$ of gnathos. Valva elongate, moderately broad, with costa evident, cucullus oblique beneath, rounded above, densely bristled, bristles on harpe in a dense patch obliquely to $\frac{1}{2}$ of disk. Sacculus moderately broad, weak, sparsely bristled. Transtilla membranous, straight, narrow. Aedoeagus stout, short, tubular, with dilated top and obliquely truncate orifice. (Gen. No. 577 D., holotype; No. 578 D., paratype.)

7th segment (Fig. 28) sclerotized, with a rather broad emargination on ventral side. Limen moderately broad, with edges scobinate, upper straight, lower twice emarginate, without knobs. Ostium broad, strong, cup-shaped above, narrowed and turned to the left beneath, emarginate and membranous at that side. Ductus bursae coiled, long. Bursa copulatrix ovoid. Signum a folded plate with large strong indentations on inner side. (Gen. No. 576 D., allotype.)

INDIA, Assam, Naga Hills, Golaghat, 1890 (*Doherty*), Walsingham Coll. No. 40224 (holotype) and 40225 (allotype); BURMA, Karen Hills (*P. T. H. G.*), v. 1923, Archbald Coll.; 2 ♂, 1 ♀; all in Brit. Mus. (Nat. Hist.) Nearest to *stipatana* Walker, but recognizable by the colour of hind wing, by the shape of fore wing, and by the genitalia.

Cerace stipatana Walker

Cerace stipatana Walker, 1863, *List Lepid. Ins. Brit. Mus.* **28**: 422-423. Moore, 1867, *Proc. Zool. Soc. Lond.*: 688. Cotes & Swinhoe, 1889, *Cat. Moths India*: 699, No. 4771. Meyrick, 1894, *Trans. R. Ent. Soc. Lond.*: 24; 1912, in Wagner, *Lepid. Cat.* **10**: 15; 1913, in Wytzman, *Gen. Ins.* **149**: 20, pl. 3, fig. 31, pl. 5, fig. 74; 1914, *Ent. Mitt.* (Suppl.) **3**: 47. Matsumura, 1931, *6000 Illustr. Ins. Japan*: 1067, fig. 2128 (♀). Caradja, 1938, *Stettin. Ent. Ztg.* **99**: 257 (*Ceraca stipatana*, err.); 1925, *Anal. Acad. Române* (3), **3**: 375. Fletcher, 1929, *Mem. Dep. Agric. India, Ent.* **11**: 43. Diakonoff, 1939, *Zoöl. Meded.* **21**: 130, figs. 1 A-B, 2 A-C; 1941, *Treubia* **18**: 29.

Head (Figs. 13, 14) white, face narrowly edged above and below with black, flattened tuft between and around bases of antennae bluish-black; collar white. Antenna black, ringed with white except along anterior side, cilia greyish. Palpus black, basal segment and median segment edged white below and at apex. Thorax purplish, two larger ovate white spots anteriorly, two smaller ones posteriorly at the sides of mesothorax, an oblique white streak on each tegula; metathorax dark brown with a large whitish or yellow pencil of hairs on each side. Abdomen pale yellow anteriorly, yellow-orange posteriorly, ♂ with posterior edge of 8th segment and posterior half of 9th segment purplish-grey, valva purple-black or purplish, more or less mixed with yellowish along upper and lower edge. Legs in ♂ pale yellow, in ♀ anterior whitish, other yellow-orange; anterior suffused with dark purplish-grey from above, except apex of tarsal segments, other with knees and basal halves of tarsal segments dark purplish-grey. Fore wing (Fig. 13) with vein 1b furcate to a little beyond middle in ♂, to a little before in ♀; both parting veins present, upper ending between veins 8 and 9, or at base of 8; terminal veins long, slightly sinuate; elongate-ovate, rather narrow, broadest at $\frac{2}{3}$, the shape of wing slightly variable: sometimes broader, more dilated posteriorly, or narrower, less dilated; costa strongly arched at base, straight in middle, distinctly projecting at $\frac{2}{3}$, straight beyond this, apex little rounded, termen almost vertical, between veins 8 and 7 strongly prominent,

subacute between veins 7-5 (accessory apex between 6 and 5), little rounded and oblique below. Purple-black, more or less suffused with crimson-purple in middle of disk from base to before termen. Markings white, rather variable: transverse oblique streaks on costa varying in size, some of them furcate above or below decreasing in length posteriorly, mostly interrupted into short streaks and dots on posterior half of wing; elsewhere horizontal rows of round dots of various sizes, not reaching termen, arranged more or less between veins, a bright orange irregular blotch on termen between veins 2-7 with 1-2 black dots, narrowed and paler below, its anterior edge irregularly scobinate, about three black dots on terminal edge, corresponding with black dots on cilia. Cilia dotted black and white. Hind wing in ♂ semiovate, apex gradually rounded, in ♀ ovate-subtrapezoid, slightly variable in shape, apex subtruncate. White, markings black, mostly tinged brownish and more or less suffused with dark brownish-grey or blackish-grey: posterior $\frac{1}{3}$ to $\frac{1}{2}$ black, its anterior edge variable in shape, mostly little suffused, often more or less dissolved into transverse blotches and dots, sometimes black suffusion reaching to anal angle; base of wing with blackish suffusion on veins seldom connected along lower edge of cell, with black terminal part. Cilia white with black patches on ends of veins.

Tegumen (Fig. 20) short and broad. Uncus with top rounded and covered with strong bristles on the underside. Hook of gnathos with a long sharp point. Socii not reaching hook of gnathos. Valva rather narrow, little dilated, cucullus obliquely rounded, its top rather narrow, harpe long, densely bristled. Sacculus narrow, densely bristled at the lower side. Transtilla narrow, straight, slightly dilated at extremities. Aedoeagus somewhat curved at base, dilated posteriorly with an obliquely truncate apex. Cornuti not perceptible. (Gen. No. 587 D., the specimen figured from Khasi Hills, Swinhoe Coll.)

7th segment (Fig. 29) strongly sclerotized, ventrally with a deep and broad emargination. Limen broad, median plate with two small projections above, twice slightly indented below. Ostium broadly cup-shaped, narrowed and curved to the left below, emarginate and partially membranous at that side. Ductus bursae coiled, long. Bursa copulatrix subovoid. Signum a folded plate with large dentations on inner side. (Gen. No. 578 D.)

The study of the male genitalia revealed that the rather heterogeneous looking material represented only one species, with a distinct tendency, however, to the formation of regional subspecies. The material was sufficient to permit recognition and separation of some of these, but not abundant enough to enable decisions to be reached on the status of some of the intermediate forms. We do not endeavour, therefore, to give a key to the subspecies described below, but refer to the descriptions concerned.

***Cerace stipatana birmensis* subsp. nov.**

♂ 38-47 mm. Fore wing with dark markings deep black; hind wing with dark area jet-black, sharply edged, mostly not reaching vein 1b, scarcely suffused along anterior edge, which is sometimes dissolved into round dots below and has a rounded excavation above middle sometimes followed by a rounded short and blunt projection between veins 2 and 3.

♀ 48–60 mm. Mostly brightly coloured, fore wing with black markings as in ♂; mostly broad, considerably dilated at $\frac{3}{8}$, but also narrow-winged females occur. Hind wing elongate subtrapezoid, truncate; dark area jet-black, mostly not reaching beyond vein 1c, its anterior edge dissolved throughout into irregular well-defined blotches and short streaks along veins, not reaching cell, scarcely suffused at all, below forming 2–4 series of transverse more or less continued streaks and blotches.

Holotype and allotype: BURMA, Ruby Mines District, xi.1922; paratypes: BURMA, Momeit, 2,000 ft.; Karen Hills, 3,000 ft.; Maymyo. vi.1890, 1910, 15–23.vi.1916, (*Doherty, Andrews*). 2 specimens without locality label. 10 ♂, 6 ♀. A distinct form, characterized by limited, well-defined jet-black area in hind wings of both sexes, and the large size of the female. Types in the British Museum (Nat. Hist.).

***Cerace stipatana clara* subsp. nov.**

♂ 37–46 mm. Dark markings black, often faintly brownish tinged. Hind wing with dark area less purely black than in foregoing, its anterior edge mostly gradually curved throughout, more or less suffused and often forming irregular serrations on veins throughout, although without a distinct rounded projection below middle; reaching always beyond vein 1b, often as far as vein 1a, often 1b suffused with black throughout.

♀ 41–55 mm. Rather variable and near to the foregoing. Hind wing of slightly variable shape, but broader and shorter, less bluntly truncate, more rounded than in *birmensis*; dark area brownish-black, paler, its anterior edge irregularly dissolved into blotches, sometimes considerably suffused between these with dark brownish-grey, especially below.

Holotype: INDIA (*H. M. Parish*); allotype: Sikkim, 1,000–4,000 ft. (*Möller*); paratypes: INDIA: Sikkim, Darjeeling; Kurseong; Mund, 1,000–4,000 ft., Jamtu Hills, '87. Assam, Naga Hills, Golaghat. BHOTAN. 24.iv.1894. (*R. P. Bretaudeau, Doherty, Dudgeon, Pilcher*.) 8 ♂, 23 ♀. Types in the British Museum (Nat. Hist.).

***Cerace stipatana formosana* subsp. nov.**

♀ 49–53 mm. Hind wing elongate-subtrapezoid, apex rather rounded. Dark area brownish-black, narrow, not reaching $\frac{1}{4}$ across wing (scarcely half-way towards cell), its anterior edge angularly excavate in middle, irregularly serrate and dissolved into blotches below, not reaching beyond 1 b. Otherwise as preceding.

FORMOSA, Koshum; Gyocha, vi.1907 (*A. E. Wileman*). 2 specimens. This form has the most limited dark area in hind wing. Type in the British Museum (Nat. Hist.).

***Cerace stipatana stipatana* Walker**

♂ 38–45 mm. Rather darkly coloured, yet dark markings in both wings brownish tinged, not pure black. Hind wing with dark area reaching over $\frac{2}{3}$, broader in apex, somewhat more abruptly narrowed below, altogether more extended than in *clara*; its anterior edge mostly forming two distinct teeth on veins 2 and 3, the latter reaching to angle of cell, and round dots below, connected by dark grey suffusion; sometimes

entire edge gradually suffused, in 2 specimens this suffusion covers anal cells entirely and runs along lower edge of cell to base.

♀ 50–56 mm. Hind wing with dark area extended over $\frac{1}{3}$ of wing at apex, reaching to angle of cell on termen, its anterior half forming numerous round black dots connected with dense blackish-grey suffusion which often reaches to anal angle; often lower edge of cell and anal veins faintly suffused; mostly long teeth on veins 2 and 3.

Type: INDIA, Sylhet; Assam, Khasia Hills, Cherrapunji, v, vi.1887, 1894, 1895. CHINA, Chung King; Kiang Si. 1894, 1911 (*B. Barry, C. Bock*). 19 ♂, 7 ♀. 3 smaller females (47 mm.) from Khasias with less suffused markings in hind wing are perhaps intermediate forms between the present and *clara*; 3 ♀ from China are smaller: 50–53 mm. Otherwise uniform and distinct. Type in the British Museum (Nat. Hist.).

Cerace stipatana exul subsp. nov.

♂ 39–41 mm. Hind wing with dark area as large as in *clara*, but the anterior edge with a rounded excavation above middle, followed by a projection crowned by two long teeth on vein 2 and 3, all the more distinct as it is followed by a small indentation; a dark grey suffusion below continued to anal angle.

♀ 50 mm. Hind wing with anterior edge of black area roundly excavate above middle, reticulate by small connected blotches below, scarcely reaching beyond 1b. Otherwise very much like *clara*.

Holotype, allotype: CHINA, Chusan Island, ix.1892. 3 ♂, 1 ♀. Types in the British Museum (Nat. Hist.).

Cerace stipatana sinensis subsp. nov.

♂ 41–43 mm. Darkly coloured, white markings in fore wing rather fine. Hind wing with dark area pure black, reaching at apex beyond $\frac{1}{3}$ of wing, mostly little narrowed below, reaching beyond anal angle, its edge suffused, veins 7 and 6 and upper edge of cell, veins 4, 3, 2, lower edge of cell and anal veins except 1c more or less distinctly suffused, especially lower edge of cell and vein 1b suffused throughout; anterior edge of black marginal area with long teeth on all terminal veins, especially distinct on 3, 2, and 1b.

♀ 49–51 mm. Hind wing rather narrowly subtrapezoid, dark area suffused and reminiscent of typical *stipatana* but with veins finely but distinctly suffused throughout; terminal suffusion reaching to anal angle.

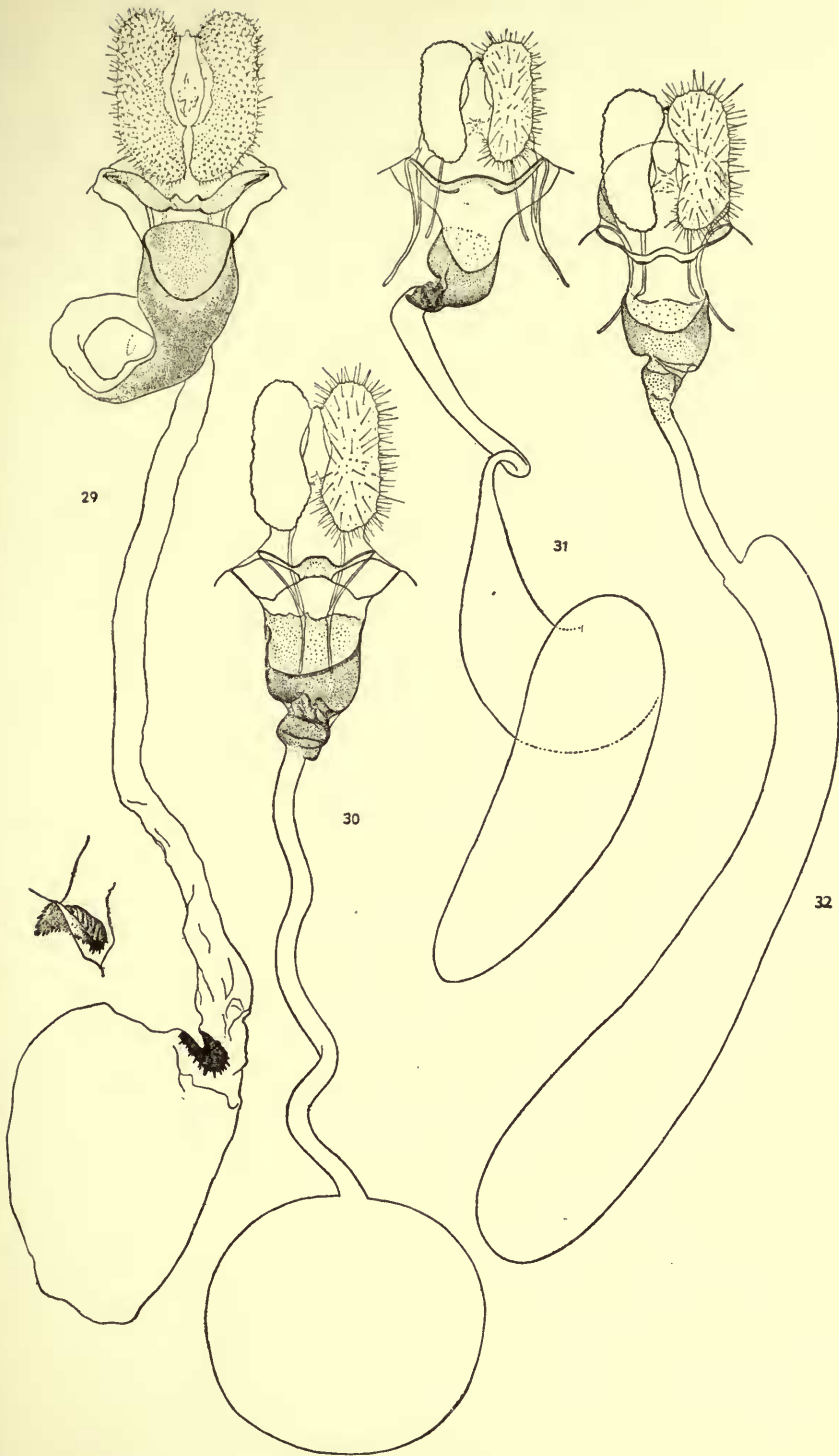
Holotype: CHINA, Ichang, Chang Yang, 4,000–6,000 ft., allotype: Sze Chuen, Chia Kou Ho, 1886 (*Leech*). Uniform and characteristic of the genus. Types in the British Museum (Nat. Hist.).

Cerace sardias Meyrick

Cerace sardias Meyrick, 1907, *J. Bombay Nat. Hist. Soc.* **17**: 748; 1912, in Wagner, *Lepid. Cat.*

10: 15; 1913, in Wytzman, *Gen. Ins.* **149**: 20. Diakonoff, 1939, *Treubia*, **18**: 29, pl. 3, fig. 2. (Genit. ♂.)

♀ 40–42 mm. Head, thorax, and abdomen bluish-black, purple-shining, the latter with bright yellow patches or broad bands on the sides of segments 3–7 anteriorly.



Figs. 29-32. Female genitalia: 29. *Cerace stipatana* Walker. 30. *C. sardias* Meyrick.
 31. *Bathypluta metoeca* sp. n. 32. *B. triphaenella* (Snellen).

Palpus dull brownish-black. Antenna blackish, shaft whitish-ringed and suffused with whitish along apical half above. Abdomen purple-black, segments 1-6 with subquadrate bright-yellow lateral spots. Legs purple-black, apex of tibiae suffused with whitish above. Fore wing with upper parting vein to between 8 and 9. Elongate-ovate, costa considerably curved throughout, stronger at extremities, apex very rounded, little distinct, termen slightly obliquely concave on vein 7, prominent between veins 6-4, almost straight and oblique below. Bright yellow; base of wing with



FIG. 33. *Cerace sardias* Meyrick, male genitalia. (By courtesy of the Editors of *Traubia*.)

a bluish-black shining streak, slightly dentate on fold; a suffused purplish-black transverse fascia, its anterior edge sharply marked, edged with fine leaden-metallic scales from middle of costa to dorsum beyond $\frac{2}{3}$, with two large excavations or indentations above fold, a smaller, less distinct indentation below fold; its posterior edge suffused, concave, extended along costa and dorsum to tornus, continued in a narrow marginal black line; terminal area dark purple-crimson, scattered rather irregularly with round dots of dark leaden-metallic shining scales, the largest along costa; one or two small yellow dots on costa at $\frac{3}{8}$. Cilia purple-black. Hind wing broadly semi-ovate, veins 3 and 4 closely approximated or connate, 6 and 7 closely approximated towards angle or connate. Bright yellow,

apical $\frac{1}{3}$ dull brownish-black, inner edge of this area almost straight, little oblique to end of 1c, mostly emarginate below 6, often irregularly serrate. Cilia black around dark area, yellow mixed with black between 1c and 1a, pale yellow on dorsum. 7th segment (Fig. 30) somewhat sclerotized posteriorly with a broad, deep emargination ventrally. Limen narrow, curved at the sides, twice emarginate in middle. Ostium very broad, strong, cup-shaped, broadly emarginate ventrally, with a split dorsally, abruptly narrowed below. Ductus bursae moderate, very narrow. Bursa copulatrix large, subspheroid. No signum. (Gen. No. 612 D.)

INDIA, Assam, Khasias, Cherrapunji, xi.1894, 1895 (*Doncaster*). 3 ♀. Type in Meyrick's collection in the British Museum (Nat. Hist.). The only male specimen of this species (from Upper Assam, in the Universitätsmuseum at Berlin) is much smaller than the above-mentioned females, but with the same colouring and markings. The description of the male genitalia (Fig. 33) is as follows:

'Tegumen moderately broad, rather short, saccus rounded-angular. Valva elongate, broadest at base, its edges parallel posteriorly, apex oblique, covered with long bristle-hairs along lower part of posterior half, anteriorly these bristles very strong. Costa indicated, rather narrow saccus indefinite, with a few short hairs. Uncus narrowed below top, its base dilated triangularly, its top rounded-ovate, with two rows of bristles below. Socii rather long, with narrow base, dilated beyond middle, hairy; reaching to $\frac{2}{3}$ of gnathos, which is robust, moderately long, with strongly curved point. Transtilla moderate, dilated in middle. Anellus moderate. Aedoeagus short and broad, its top produced below, with oblique orifice. Cornuti not perceptible (broken off?). (Slide No. 144 D).'

BATHYPLUTA gen. nov.

βαθύπλουτος = very rich

Head (Fig. 34) smooth, a short flattened crest on vertex encircling the base of antennae, depressed in middle. Ocelli posterior. Proboscis short. Antenna scarcely $\frac{1}{2}$, fasciculate-ciliate in ♂, finely ciliate in ♀, scape stout, short. Palpus short, porrect, median segment smooth above, with a short rough fringe of scales below, not dilated, terminal segment very short, obtuse, sometimes almost concealed. Thorax and legs

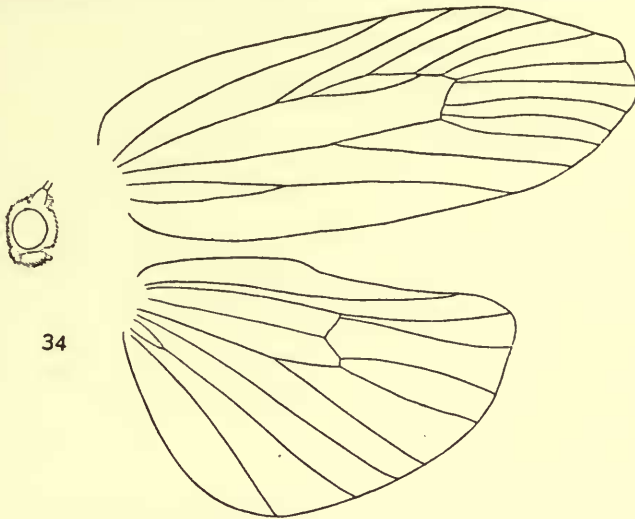


FIG. 34. *Bathypluta triphaenella* (Snellen), ♀ wing neurotation and head.

smooth. Fore wing (Fig. 34) without costal fold in male, rather narrow, elongate-ovate, costa abruptly curved at base, slightly concave in middle, distinctly prominent at $\frac{2}{3}$, apex slightly obliquely notched on vein 7, termen acutely prominent below notch. All veins separate, 1b furcate along basal $\frac{1}{3}$ or a little beyond this, 2 from beyond $\frac{2}{3}$ of lower edge of cell, 3 from angle, 4 somewhat approximated or rather remote, 5 parallel to 4, widely remote from 6, 7 to notch of termen, 9 and 10 tolerably parallel, 11 from about $\frac{1}{2}$, upper parting vein to between 8 and 9, lower parting vein present. Hind wing elongate-subtrapezoid, without cubital pecten. 1b shortly furcate at base, 2 from $\frac{2}{3}$, 3 from angle, 4 absent, 5 approximated to 3 at base, 6 and 7 connate, seldom closely approximated towards base; parting vein weak, to middle of angulate discoidal.

Type species *Cerace triphaenella* Snellen.

A development of *Cerace*. The neurotation of the hind wing, the shape and the typical colouring of the fore wing justify the separation of this genus.

KEY TO THE SPECIES OF *Bathypluta*

- 1. Fore wing with ground colour dark brownish-black scattered with bluish-leadен patches and dots *triphaenella nox*
- Fore wing with ground colour not thus 2

2. Fore wing blackish-brown, apical $\frac{2}{3}$ reddish, suffused with yellowish
triphaenella melanoptera
 Fore wing with ground colour reddish-ferruginous or orange 3
3. Hind wing rather narrow, elongate-subtrapezoid, termen concave below apex,
 terminal band little narrowed, running to anal angle . . . *triphaenella sparna*
 Hind wing broad, elongate-semiovate, termen scarcely concave, terminal band
 narrowed below, to vein 1b 4
4. Costal marks in fore wing numerous: irregular, narrow oblique streaks *metoeca*
 Costal marks in fore wing few: large rounded or erect spots *triphaenella triphaenella*

Bathylpota triphaenella (Snellen)

Cerace triphaenella Snellen, 1903, *Tijdschr. Ent.* **46**: 26, pl. 4, fig. 1 (♀). Meyrick, 1912, in Wagner, *Lepid. Cat.* **10**: 15. 1913, in Wytzman, *Gen. Ins.* **149**: 20. Diakonoff, 1939, *Zoöl. Meded.* **21**: 131, fig. 1 c; 1941, *Treubia*, **18**: 377 (descr. ♂, food plants).

♂ 22 mm. Head blackish-violet, mixed with dark purple on vertex. Antenna whitish, ringed black, ciliations in ♂ white. Palpus blackish-violet. Abdomen blackish-violet, anal tuft light yellow. Legs blackish, median femur and top of tibia ochreous, posterior leg whitish-ochreous, femur blackish above. Fore wing with costa strongly abruptly arched at base, concave before middle, gradually slightly curved towards apex, apex broadly rounded, termen outwardly oblique above, considerably prominent between veins 7-4, vein 6 to this secondary apex, termen little curved, oblique beneath. Ground colour bright orange-yellow, scattered with whitish-silvery shining dots; a blackish-violet triangular blotch on base of wing from costa across $\frac{3}{4}$ of wing breadth, its posterior edge straight, little oblique, its lower angle sharply projecting; some blackish and purple scales on $\frac{1}{8}$ of dorsum; a very narrow suffused dark purplish streak along costa, dilated posteriorly, interrupted about six times by silvery shining blotches above mentioned, the last of these on $\frac{1}{2}$ of costa; apical part of wing from before $\frac{2}{3}$ reddish-purple, suffused with blackish-brown along anterior edge, which is convex and shows 5 diffuse dentations; apical area scattered with ochreous-yellow scales and dots and with shining bluish-leadен blotches: 4-5 transverse crescent streaks on costa, smaller, round dots in disk; a yellow terminal suffusion on vein 6. Cilia brownish-black, mixed with yellow on vein 6. Hind wing bright yellow; apical fifth blackish with dentate anterior edge. Cilia blackish.

Tegumen (Fig. 21) moderate. Uncus broadly rounded above, densely bristled below. Gnathos moderate, with a strong broad point. Socii small, scarcely $\frac{1}{3}$ of gnathos. Valva elongate, little dilated; cucullus obliquely truncate, its top somewhat projecting; harpe short; sacculus moderately broad but strong. Transtilla narrow, straight. Aedeagus short, tubular, its orifice with somewhat indented edge. Cornuti not perceptible. (Gen. No. 601 D.)

♀ 37-39 mm. Head bright ochreous mixed with reddish-fuscous, tuft on vertex reddish-fuscous, collar ochreous. Antenna with basal joint ferruginous-black, shaft white, ringed with blackish. Palpus ferruginous-blackish; median segment edged below and on apex with fuscous-ochreous. Thorax bright ochreous, markings reddish-fuscous: an anterior and a median transverse band and a median longitudinal streak

on mesothorax; metathorax and a brush of long hairs on each side dark brown. Abdomen golden-yellow, tergites with posterior half dark bronze-brown, each segment with a quadrate bronze-brown lateral patch; anal tuft golden-yellow. Legs bronze-brown, tibiae especially at extremities, and tarsi mixed with ochreous. Fore wing with upper parting vein weak in middle, to between veins 8 and 9, lower parting vein weak, terminal veins long, slightly sinuate. Rather narrow, elongate, broadest at $\frac{4}{5}$; costa abruptly strongly arched at base, slightly concave in middle, rounded and somewhat projecting at $\frac{4}{5}$, oblique posteriorly, apex broadly rounded, termen slightly outwardly oblique above, strongly prominent between veins 7-4, vein 6 to top of this prominence, termen oblique beneath. Reddish-fuscous, covered with irregular series of round dots of different size, which are more or less completely edged with leaden-metallic shining scales; a row of large somewhat oblique round spots along costa, below this the wing is rather irregularly covered with dots of very different sizes, except in disk beyond middle, where two short longitudinal streaks of ground colour remain undisturbed, somewhat darker reddish-ochreous. Cilia ochreous mixed with fuscous. Hind wing bright yellow, apical fifth black, its anterior edge almost straight, slightly suffused, faintly serrate, from $\frac{1}{5}$ of costa to end of fold. Cilia black from apex to anal angle, whitish-yellow beyond this.

7th segment (Fig. 32) not sclerotized, emarginate ventrally. Ostium broad, cup-shaped, strong, abruptly narrowed beneath. Limen very narrow in middle, slightly dilated at the sides. Ductus bursae short. Bursa copulatrix very long, elongate-tubular, pear-shaped at the end. No signum. (Gen. No. 613 D.; No. 612 D. of a reared and not yet fertilized specimen with bursa strongly constricted and appearing short. No. 586 D. with a minute sclerotization at the beginning of the bursa copulatrix, which might be the remains of an atrophied signum; this specimen is Snellen's cotype in the Leiden Museum.)

WEST JAVA, Tjinjirean, 4,700 ft., Sindanglaja, 3,600 ft. (*Dr. P. van der Goot, L. J. Toxopeus*). 2 ♂, 10 ♀. There are also one ♂ in the British Museum, and another in the author's collection. The above redescription of the ♀ is drawn after Snellen's type specimen, which is in the Leiden Museum, Netherlands.

***Bathypluta triphaenella nox* Diakonoff**

Cerace triphaenella nox Diakonoff, 1941, *Treubia* 18: 378 (♀, food plant).

♀ 32 mm. Head, palpus, thorax, and fore wing unicolorous dark brownish-black, regularly scattered with rounded and elongate shining bluish-lead patches and dots. (These patches are congruent with light markings in the typical form.) Hind wing, abdomen and legs as in typical form.

WEST JAVA, Sindanglaja, x.1935, feeding on leaves of the tea-plant (*Dr. P. van der Goot*); Soekanegara, i.vi.1936 (*Dr. L. J. Toxopeus*). 2 ♀. The genitalia are identical with those of *t. triphaenella*.

***Bathypluta triphaenella melanoptera* Diakonoff**

Cerace triphaenella melanoptera Diakonoff, 1911, *Treubia*, 18: 378 (♂, food plants).

♂ 22 mm. Head and palpus reddish-brown, mixed with ochreous; thorax and tegula dark brownish-purple and red, collar and edge of tegula ochreous. Abdomen

dark yellow, each segment with a dark brown band, interrupted laterally. Fore wing somewhat broader than in ♂ of the type, blackish-brown; apical $\frac{2}{3}$ reddish, suffused with brownish, especially in tornus, with suffused yellowish dots along costa and apex; wing is scattered throughout with leaden-metallic spots, less distinct than in the typical form; a reddish streak on $\frac{1}{3}$ of dorsum. Hind wing dark greyish-brown with costa from base to $\frac{3}{4}$ orange-yellow, scattered with brown scales, especially on veins 3-6.

♀ 21 mm. Head, thorax, and abdomen reddish-black, anal tuft orange-yellow. Fore wing as in ♂ but darker, apical part dark brownish-red, metallic spots more distinct. Hind wing orange-yellow, paler at base, suffused with blackish on veins beyond cell, with marginal $\frac{1}{3}$ blackish, sometimes entirely suffused with blackish.

WEST JAVA, Sindanglaja, 6.ix.1935, larva attacking leaves of the tea-plant; Tjinjirean, 11.x.1935, larva attacking the leaves of the Cinchona-tree. (*Dr. P. van der Goot.*) 1 ♂, 2 ♀. The genitalia are identical with those of *t. triphaenella*.

***Bathypluta triphaenella sparna* subsp. nov.**

σπαρνός = rare

♀ 40 mm. Head and thorax orange-ochreous, mixed with reddish-ferruginous, except face below, vertex posteriorly and posterior half of tegula. Palpus dark brown, mixed with ochreous above and beneath. Antenna blackish-brown, ringed with whitish above, whitish beneath. Abdomen golden yellow, lateral transverse elongate spots and dorsal posterior bands, which are broad and narrowed laterally dark brown. Legs ochreous-yellow beneath, golden-yellow, anterior orange tinged, tibiae and tarsal segments with dark brown basal bands. Fore wing rather narrowly elongate, little dilated, costa abruptly strongly arched along basal $\frac{2}{3}$, slightly concave before middle, broadly curved and slightly prominent at $\frac{3}{4}$, apex obliquely rounded, termen very oblique and concave on vein 7, projecting between 6 and 5, gently rounded, very oblique beneath. Upper parting vein to between 8 and 9. Reddish-ferruginous, markings ochreous more or less edged with fine leaden-metallic shining scales. A row of rather irregular, rounded or erect-semiovate spots along costa; wing elsewhere covered with irregular rounded spots of very different size, groups of these more or less confluent, forming larger patches of ochreous colour especially in disk before and beyond middle; a subquadrate somewhat suffused blotch of ground colour in middle of disk reaching from upper edge of cell to vein 2, slightly obliquely erected along this towards tornus, interrupted by only a few ochreous rounded dots; cilia ochreous, with a dark brown median band; interrupted to form ochreous patches in cells. Hind wing with veins 6 and 7 connate; rather narrow, elongate subtrapezoid, apex obtusely prominent, termen distinctly concave on vein 5; bright-yellow, somewhat paler towards base, a brownish-black marginal band from costa before apex, along termen to anal angle, occupying about $\frac{1}{4}$ of wing at apex, somewhat narrowed below as far as vein 3, narrower still but with inner edge parallel from vein 3 to tornus; inner edge slightly indent on vein 3, somewhat suffused. Cilia dark grey, with a fine pale basal line, followed by a broad black antemedian line.

EAST JAVA, Mt. Tengger. Type, unique, in the British Museum (Nat. Hist.).

Distinctly differing from typical *triphaenella* by the shape of the hind wing and by its dark marginal band which reaches to the tornus. Gen. No. 605 D., probably a not fertilized specimen with bursa copulatrix constricted in the same way as mentioned for No. 586 D.

Bathypluta metoecca sp. nov.

μέτοικος = a stranger

♀ 44 mm. Head and palpus pale whitish-ochreous, vertex mixed with ferruginous scales, palpus slightly mixed with brownish. Antenna ferruginous-brown, faintly ringed with pale ochreous above. Thorax light ochreous, mixed with reddish-ferruginous, except edges of tegulae and point of mesothorax, which has a median reddish-ferruginous streak; metathorax dark brown, lateral pencils brownish-grey. Abdomen golden-yellow, each segment with a broad dark coffee-brown band, extended over whole segment in middle, narrowed laterally, lateral patches elongate, black, anal tuft yellow-ochreous; under side dark brown. Legs ochreous-yellow, more or less suffused with dark brown above, femora dark brown above, basal segment of posterior tarsus with dark brown ring. Fore wing rather narrowly elongate, costa abruptly strongly curved at base, slightly concave at $\frac{1}{3}$, broadly rounded prominent at $\frac{2}{3}$, oblique but little curved before apex, apex with a small excavation on vein 7, termen prominent on vein 6, oblique, little curved beneath. Upper parting vein to between 8 and 9. Reddish-ferruginous, markings rather pale ochreous more or less edged with dark leaden-metallic brightly shining scales. A row of short, oblique blotches along costa, becoming wider separate posteriorly, scarcely reaching $\frac{1}{3}$ towards upper edge of cell; elsewhere densely dotted and strewn with small round patches of different size, more or less arranged in horizontal rows; a series of larger dots below basal half of fold; markings more or less confluent on basal $\frac{1}{3}$ of disk above fold except towards costa and from end of cell to termen, accentuating a suffused rounded large patch of ground colour in middle of disk little marked with dots; dorsum at $\frac{1}{4}$ and before tornus also less disturbed by dotting. Cilia pale ochreous, basal half dark grey. Hind wing elongate subtrapezoid, with veins 3 and 4 separate. Golden-yellow, glossy; a dull brownish-black, band along apex and termen, its anterior edge concave, gradually curved, slightly irregularly indent on veins, from costa beyond $\frac{3}{4}$, to beyond end of vein 1c; cilia blackish.

7th segment (Fig. 31), not sclerotized, broadly emarginate ventrally. Limen narrow, curved at the sides and in middle. Ostium very broad, shallow-cup-shaped, abruptly narrowed below and turned to the left. Ductus bursae rather narrow, moderately long. Bursa copulatrix very long, tubular, coiled in middle. (Gen. No. 602 D.)

LESSER SUNDA ISLANDS, Pura Id. (Alor Group), 2,000-4,000 ft., x-xi.1891 (Doherty). Type, unique, in the British Museum (Nat. Hist.). Closely allied to *triphaenella*.



PRESENTED